UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF NORTH CAROLINA
ASHEVILLE DIVISION

STATE OF NORTH CAROLINA ex rel. Roy Cooper, Attorney General,	)	
Plaintiff,	)	No. 1:06-CV-20
vs.	)	**VOLUME 4A**
TENNESSEE VALLEY AUTHORITY,	)	[Page 767-892]
Defendant.	)	

TRANSCRIPT OF TRIAL PROCEEDINGS
BEFORE THE HONORABLE LACY H. THORNBURG
UNITED STATES DISTRICT COURT JUDGE
JULY 17, 2008

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I N D E X

PLAINTIFF WITNESSES: **PAGE**

PLAINTIFF'S EXHIBITS

NUMBER	IDENTIFIED	ADMITTED
176		832
193		844
221-224		885
464-466		781

P-R-O-C-E-E-D-I-N-G-S

THE COURT: Mr. Gulick, did you wish to address the Court?

MR. GULICK: Your Honor, very briefly. I'm Jim Gulick from the North Carolina Attorney General's office. Your Honor, a brief matter.

The matter of the decision of the D.C. Circuit has come up several times during the course of this proceeding, and I thought it was probably appropriate for us to hand up to the Court a copy of that decision in its entirety so that you have the opportunity at your appropriate leisure to consider just for yourself what it does and doesn't do. And I don't intend to make any argument about it at this time but simply to hand up two copies of that decision.

THE COURT: Yes. Thank you, but I already have a copy of it. I just haven't had a chance to read it.

MR. GULICK: Very good, Your Honor. That's a pretty lengthy document. I just wanted to make a copy available if you need it.

THE COURT: All right. Thank you.

MR. GULICK: Thank you.

(Proceedings interrupted by an unrelated matter.)

THE COURT: All right. We're ready to proceed.

MR. GOODSTEIN: Thank you, Your Honor.

North Carolina calls its next witness, Lyle Chinkin.

LYLE CHINKIN,

being duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

MR. GOODSTEIN: Your Honor, if I could approach, I have a binder for Mr. Chinkin as well.

THE COURT: All right. Let's proceed.

MR. GOODSTEIN: Thank you, Your Honor.

BY MR. GOODSTEIN:

Q. State your full name for the record, please.

A. Lyle Chinkin.

Q. How are you currently employed, Mr. Chinkin?

A. I'm currently the president of Sonoma Technology, Incorporated, in Petuluma, California.

Q. Your CV is marked as Plaintiff's Exhibit 426. It should be the first one in your book.

MR. GOODSTEIN: And it should be the first one in your book, Your Honor.

BY MR. GOODSTEIN:

Q. So you work with Mr. Wheeler at Sonoma Technologies?

A. That's correct.

I can hear you better now.

Q. Can you tell us what your role in this case has been?

A. Sure. I've worked with Mr. Wheeler to direct our staff

at Sonoma Technology to do the air quality modeling and do analyses, as well as the analyses that I've looked at personally, and looking at the work of our scientists, EPA experts, SAMI, et cetera.

I was also a 30(b)(6) witness for the State of North Carolina in the case, and I helped prepare the three expert reports that we have turned in, Mr. Wheeler and myself.

Q. And so you've reached some conclusions about improvements to air quality in the region that would result from the additional controls installed by TVA as requested by North Carolina in this case?

A. Yes, that's correct. I did some conclusions.

MR. FINE: Your Honor, I apologize for the interruption, but as with Mr. Wheeler, we have a stipulation as to Mr. Chinkin's area of expertise in this case.

THE COURT: All right, sir.

BY MR. GOODSTEIN:

Q. And that is air quality analysis, including emissions inventories. Is that your area of expertise, Mr. Chinkin?

A. That is correct.

Q. And can you give us a summary of your background and experience in that area, please.

A. Sure. Well, I'll start with my education and work into my work experience.

I went to the University of California at Davis, where I

studied in atomospheric science, meteorology, and I got an undergraduate and graduate degree from University of California at Davis. But I actually began my work while I was still going to school. So if you turn to the second page, it has a very detailed outline, but I just want to hit a few the highlights.

I actually started my career working at a TV station, in the weather department. One of my goals was to explain the weather to people. I also worked as a student intern at the California Air Resources Board, which is the leading agency in California for regulating air quality, and it's one of the leading agencies in the country for regulating air quality. And that's actually where I first met Mr. Wheeler. He and I worked together at the California Air Resources Board.

While still a senior and undergraduate at UC Davis, the California Air Resources Board offered me a unique opportunity for a full time job on the condition I went back to school part-time and completed my degree. So I actually started as a professional in the air quality arena before I completed my undergraduate degree, which I did go back and complete Summa cum laude.

At the Air Resources Board, I did a considerable amount of air quality analyses, I did technical scientific statistical reports, and worked in the same section as Mr. Wheeler, where we did air quality forecasting seven days

a week.

I was given an opportunity by the U.S. Environmental Protection Agency. They identified me and offered me the opportunity to go back to grad school and would pay my way, and I continued to work at the Air Resources Board and completed my graduate degree, which was a focus on visibility impacts from agricultural burning activities, which was a big issue in California in those days, and my thesis focused on using instrumentation and human observers and understanding the difference between what real visibility is and what instruments are telling you the visibility is.

Subsequent to completing my master's degree, I was given an opportunity to join a consulting firm called SAI, not to be confused with where I work now, STI. It was called Systems Applications International. And it was the incubator, if not the birthplace, of the current modern-day air quality model, the first air quality model accepted by the USEPA, called the Urban Airshed Model. And that is, in fact, where I actually worked with Dr. Tesche, TVA's expert in this case. He and I worked at the same firm many years ago.

I worked at that firm quite some time, about nine years, where I rose to the ranks of the manager of emissions modeling. And some of the highlights of the projects I worked on were to develop emissions inventories for hundreds

of cities across the world actually, in Asia, America, and I developed and was co-author of the EPA guidance document on how to prepare emission inventories for photochemical models, and that's still the guidance document today.

I had an opportunity -- I was recruited to join Sonoma Technology in 1992, where I headed up their emissions inventory program, and I worked my way through the ranks to become president of the company about two years ago.

Q. All right. And what are your current responsibilities at Sonoma Technologies?

A. Well, as president of Sonoma Technology, I oversee all the divisions of the company. We're about a 50-person company now. And we cover all areas of air quality research, applications, modeling, as you heard about from Mr. Wheeler yesterday.

We run, for example, the USEPA "AIRNow" website. Many of you may have heard of that. It's A-I-R-N-O-W. And that allows anyone in America to go on the Internet and see what the air quality is right now outside their homes. And we run that for the whole country, 24 hours a day, 365 days a year.

We also, for example, have projects for the U.S. Forest Service, where, under a NASA grant, we're running CMAQ, as Mr. Wheeler said yesterday, twice daily every day, 365 days a year, to forecast the impact of smoke from both wildfires and man-made prescribed burning throughout the country. So we

have some pretty extensive programs on modeling and air quality analysis.

We also do air quality health research. I personally was involved in a study for the City of Houston where we looked at air quality benefits, the health benefits of changes in air quality for the City of Houston for both ozone and PM. It was under what was called the Excel Program back in those days. So it's pretty extensive.

The roots of the company, if you haven't heard of Sonoma Technology, was flying airplanes and measuring the air pollution over cities. In fact, the founder of the company, who is still with the company, was the first to prove -- and it had to be proved in those days. It sounds funny today. But he was the first to prove that air pollution crossed county lines. He flew his airplane in Los Angeles. At that time, Los Angeles County was insistent that their pollution did not cross the county line into Riverside County, and he had to prove that, and that became the first unified air pollution control district because he proved air pollution knew no boundaries.

And we've been flying airplanes ever since and measuring air pollution throughout the country, and world, for that matter. We've measured air pollution at the South Pole. We've measured air pollution in Asia. We do many, many field studies using state-of-the-art air quality instruments.

Q. Could you summarize for us your experience in emissions inventories, air quality analysis, and how you use air quality modeling in your work?

A. Sure. Over the years, I have been asked by many clients to use, you know, my knowledge of emission inventories. I've personally been involved in the collection of emissions data, learning how emissions come from various source categories.

One of the most recent studies I think you might be interested in hearing about is how does air pollution vary by day and week. It's a very interesting issue that people want to know because, if you think about it, pretty much every day, weekdays, Monday through Friday, pollution is about the same in terms of the emissions from cars and factories because that's when everybody goes to work, but the weekends are very different. So no one has ever really studied weekends until the last few years.

I've been involved in a number of studies for USEPA, California Air Resources Board and private industry, looking at the differences between pollution on weekdays and weekends, and so I've personally been involved in those studies.

I've been asked by many areas around the country dealing with air quality issues to help them, give them advice, frankly, on what control programs are most effective for them. I've done work in Kansas City; Minnesota; the Twin

Cities; Columbus, Ohio.

I recently was an invited speaker at a group for public citizens. There were 200 citizens. Each had paid $500 to hear how the air quality in the mountain counties of California could be improved, because similar to the evidence in this case in the Great Smoky Mountains, the pollution is being transported in to where they live. They can't stop the pollution from coming in and they want to know what they can do about it.

That's the kind of work I do. I try to explain complicated air quality issues to lay public, private industry leaders and government officials.

Q. And you prepared several reports along with Mr. Wheeler in this case?

A. That's correct.

Q. And this should be at the back of your binder. Can you identify Plaintiff's Exhibit 464, 465 and 466?

A. Yes, I can.

MR. GOODSTEIN: Your Honor, at this time we're going to offer Plaintiff's Exhibit 426 into evidence, which is Mr. Chinkin's CV, and then his reports.

THE COURT: All right. Let that be admitted.

MR. FINE: Your Honor, we have no objection to the CV and we have no objection to the first of the two reports, which I believe have been marked as Plaintiff's Exhibits 464

and 465.

We do have an objection to the introduction into evidence Plaintiff's Exhibit 466, which is what is referred to in the binder as the Letter Report from June of 2007. It is our position that this report was submitted in an untimely fashion under the Court's order in terms of the exchange of expert reports and should be excluded from the record on that basis.

THE COURT: When was it given to you or made available?

MR. FINE: Sir, it's dated June 20th, 2007, and was made available to TVA at that time. There was no newly revealed information. The newly revealed information from TVA caused the third report. No additional modeling was done for the third report. We believe on that basis and under the terms of the Court's order that it was an untimely expert report and should not be made part of the record.

MR. GOODSTEIN: Your Honor, we received a supplemental report from the defendant's experts in this area in June of 2007, and this letter report from Mr. Wheeler and Mr. Chinkin was disclosed on June 20th, 2007. It was in the discovery period.

We had previously received an expert report from Dr. Tesche and Dr. Mueller in February of 2007, and then we received a supplement from them in June of 2007, and under

the rules, we have 30 days to issue a rebuttal report, if necessary, based on new information that we receive, and in June, 2007, we received a 30-page expert report, supplemental expert report, from Dr. Tesche and Dr. Mueller, and this report from Mr. Chinkin and Mr. Wheeler is a short rebuttal to some of those points.

MR. FINE: Your Honor, the supplemental report from Dr. Tesche and Mr. Mueller that Mr. Goodstein is referring to was submitted within the agreed deadline for expert reports. The letter report did not rebut anything in the Tesche and Mueller supplemental report and, as I previously stated, was not in -- was not in response to new information, and, in fact, as I'm sure Mr. Chinkin will admit, no additional modeling was made for that report, for this letter report.

MR. GOODSTEIN: Your Honor, if I can approach, I can show the Court the report that this is responding to.

This all occurred within the discovery period, and TVA never took Mr. Chinkin's deposition regarding any of his reports in this case. And this letter report was disclosed a long time ago, within the discovery period, and they never have taken this gentleman's deposition. They've never asked for his deposition. So I find it hard to accept any kind of prejudice argument, much less this was a timely disclosure in the discovery period responding to a 30-plus page supplemental report by their experts.

THE COURT: Mr. Fine, you've had a year to look at this, haven't you?

MR. FINE: Yes, Your Honor.

THE COURT: Where is the prejudice? I don't like lawyers ignoring court orders. On the other hand, there's occasionally a missed step like this of importance, and it seems to me that, absent a showing of some substantial prejudice, I'm inclined to overrule your objection.

MR. FINE: Your Honor, I understand your approach to this matter, but I would just point out for the sake of the record that this letter report was given during the last week of the discovery period, during a time when five depositions were scheduled that week.

There was no time to take Mr. Chinkin's deposition with regard to this letter report. He was tendered as a 30(b)(6) deponent, and his deposition was taken within that context, as I think Mr. Chinkin himself has testified himself already this morning. But we believe that coming in with this report in the last week of the discovery period when there was much else going on is sufficient grounds to find that there was prejudice to the defendant in the matter.

MR. GOODSTEIN: Your Honor, your case management order, on page 3, dealing with expert witnesses -- this was your order that was filed in July of 2006. It's document 21 -- provides for expert witnesses' supplementations under

Rule 26(e) shall be ongoing throughout these proceedings. And consistent with 26(e), we filed this letter report in a timely manner and consistent with your order and the rules.

We had several depositions scheduled back in July because we couldn't complete them in June, and if counsel had any scheduling issue with the desire to take Mr. Chinkin's deposition, we certainly would have accommodated them. We had several depositions continue into July that year, and as you know, Your Honor, we were prepared to produce any of our expert witnesses for deposition, to be fully examined on their reports, and had TVA requested that, we certainly would have made Mr. Chinkin available.

THE COURT: All right. Show the Court overrules the objection and gives the defendant an exception, and let's move the case along.

MR. GOODSTEIN: Thank you, Your Honor.

MR. FINE: Very well, Your Honor.

THE COURT: Thank you, gentlemen.

MR. GOODSTEIN: We offer 464, 465 and 466 into evidence at this time.

THE COURT: Let those be admitted.

(Plaintiff's Exhibits 464, 465, and 466 received.)

BY MR. GOODSTEIN:

Q. Mr. Chinkin, you mentioned you had developed a

conclusion regarding the benefits that would result from the additional controls on TVA plants sought by North Carolina.

Have you also developed a conclusion regarding the current impacts of the excess emissions from TVA's power plants?

A. Yes, I have.

Q. And could you tell us a little bit about the method that you used to develop those conclusions?

A. Well, the approach I take in drawing conclusions in a situation like this is to look at all the available information I can, and in this case that included our own STI modeling, it included the modeling of SAMI that was referred to for the last several days, it included modeling performed by USEPA in support of the CAIR rule, the Clean Air Interstate Rule, and also the TVA expert's own model; and I looked at a number of other governmental resource documents, including the National Park Service, for example, and other available information from my normal means of getting it, you know, through the public literature, peer review literature.

Those are the techniques I used to reach my conclusions.

Q. And could you summarize your conclusions for us, and then we'll walk through the evidence that you put together and your analysis of that. But if you could give us just an overview of your conclusions at this time.

A. Sure. I think it's really important that I make it as

plain and simple as possible.

My conclusion in this case about the current impacts from TVA's emissions from the coal-fired power plants is that they are very large and substantial and, in comparison to studies I've done throughout the country, these are huge impacts, and I think the evidence will show that.

Q. Let's first talk about the meteorological information that you considered, Mr. Chinkin. And if it would be helpful, you can refer to the figure on the easel.

MR. GOODSTEIN: With permission of the Court, Your Honor, if we could have Mr. Chinkin step down and refer to the figure on the easel.

THE COURT: Yes.

MR. GOODSTEIN: All right.

THE COURT: And what number are we looking at?

MR. GOODSTEIN: Plaintiff's Exhibit 140, Your Honor.

THE COURT: All right.

MR. GOODSTEIN: And it's also on your screen, Your Honor, if that's a better view for the Court.

THE WITNESS: Okay. Well, I think what's really important to understand is that, as Mr. Wheeler, you know, briefly mentioned yesterday, you know, weather dominates where air pollution moves to. And it's important to understand the weather in the Southeast.

We all watch the evening weather probably, and we all are probably familiar with high pressures and low pressures.

MR. FINE: Your Honor, I think this is getting into cumulative testimony. We heard extensively from Mr. Wheeler about the dominant weather patterns in the Southeast yesterday and I'm not sure we need to have Mr. Chinkin repeat it.

MR. GOODSTEIN: Your Honor, as I indicated yesterday --

THE COURT: Overruled. Answer the question.

MR. GOODSTEIN: Thank you, Your Honor.

THE WITNESS: What I was about to say was that these high pressure systems that tend to set up in the southeast United States in the summertime tend to cause the pollution to move from west to east with a circular pattern. And what I intend to show is that, through the evidence, that this pattern, this typical pattern, all summer long, carries this pollution from all the power plants, those in Alabama, those in Tennessee, and those in Kentucky, into North Carolina, causing impact there, as well as impacts in Alabama, Tennessee, and Kentucky, and I'm going to go through that in a very detailed way to see how the weather causes that impact.

THE COURT: All right, sir.

BY MR. GOODSTEIN:

Q. Okay. Now I'd like you to refer to some of the other modeling evidence which was received yesterday during Mr. Wheeler's testimony. And let's start with Plaintiff's Exhibit 151 and ask you to identify that.

A. Yes. That is our modeling.

Q. And can you tell us what this shows?

A. Okay. What I'd like to do is -- I'm going to show this on the electronic screen.

Let me first say, before I actually get into the details of this particular plot, that we actually did this for every day of the entire year and we looked at every day's impacts. In fact, we looked at it hourly. If we were to print out all of those, our expert report would have been 10,000 pages long. So what we tried to do was just show sample plots in the expert report. And, in fact, I'm going to show even less samples today, just giving, really, glimpses. But every day these types of things are demonstrated in air quality modeling.

If you look on the left, this is showing you where the air pollution was that day. This is for ozone. So you can see there are yellow areas, green areas, and then some sort of red and purple areas, and that's where the air pollution was worse on that day, those sort of dark orange, red, and purple areas. And you can see there are some areas there in

central North Carolina that were pretty high that day.

On the right-hand side, what we're showing is what were the impacts from TVA's coal-fired power plants on that day. And maybe now is a good time to step back for a second and talk about what that day means.

There was a lot of discussion about 2013 versus, you know, 2007 or current. And I think it's important to understand that the way modelers analyze impacts from a source is to say what is the air pollution to the best of our ability the models can predict, and then remove that source and say what is the difference in that air pollution when the source is removed.

When we do these around the country, we ask ourselves when is a reasonable time for that source to have controls installed on that source. If that source could have controls installed instantly, you know, magically, today, we could have two models of today's emissions and say what would it be with or without that control on that source. But as we all know, it takes several years, at least, to install controls.

So the way this is done is to have a future year. There is nothing magical about 2013. That was the year we chose in this case. It seemed like a reasonable time. It coincided with the Clean Smokestacks Act initiative requirements. But we could have chosen 2009. We could have chosen 2007. The year is really irrelevant, because what you do is you hold

constant everything but the change in the source you're trying to understand. And so we shouldn't get hung up on this is July 27, 2013. It's just looking at the impact of taking those sources out of the inventory. Everything else is being held constant.

So let's look at this day. So we looked at July 27, 2013. You can see individual plume impacts from each of the power plants. On this particular one, this is ozone. And as we've heard from other witnesses, what's causing ozone is NOx, the NOx emissions from the power plants, and so, you know, there are -- you know, the reductions of the NOx causes reductions in ozone.

So you can actually identify individual power plant plumes from the number of the power plants on this day in this plot.

Q. And you're talking about the TVA power plants?

A. These are TVA power plants, that's correct. That's all we have isolated here are just the TVA coal-fired power plants that we have applied NOx reductions in this control scenario.

And as Dr. Staudt referred to the other day, we didn't do that at every power plant, just the ones that he did in his control scenario. You can see the benefits of those NOx reductions strongly in Tennessee, strongly in Alabama, some in Georgia, lots of benefits in North Carolina, lots of

benefits in Kentucky, and all the way up into Indiana and Illinois you see benefits.

So there are benefits throughout the entire region on this particular day, but you can see each power plant's impact individually and how they're all affecting each state and throughout the region.

Q. So this shows the current impacts as well as the patterns?

A. That's correct.

Q. So let's take a look at one of your figures for PM2.5 concentrations, which is marked for evidence as Plaintiff's Exhibit 143.

A. Okay. Similarly, for ozone, here is a plot, again, just an example day. We have these for every hour of every day for the entire year, but we're just looking at one day. And again, what you can see on the left-hand side in the very colorful map is where was air quality -- what were the air quality levels predicted for that day. And you can see this is a scale that goes from zero up until the purple, 20 or greater.

And so you can see, in North Carolina, on that day, we predicted the orange and reds and some yellows throughout the state of North Carolina as an example. And then, on the right-hand side, again what we see is what are the impacts; and then the flip side of that coin, what would the benefits

be if the power plants, TVA's coal-fired power plants, were controlled. In this case we're talking about PM2.5, so we're talking about SO2 reductions.

And so, again, you can actually identify by looking at it -- I'll try to use my finger pointer here. You can see individual plumes from those power plants lining up, and you can actually follow the trajectory and see which areas are being impacted and, conversely, which areas have the greatest benefits from controls on power plants on that day, and it's easily identified individual locations of each power plant.

Q. And you're talking about TVA's power plants?

A. Again, these are just TVA's coal-fired power plants that we're isolating here.

Q. Can you identify for us which of those plants are shown on those plumes?

A. Yes, I can.

Q. And you can refer to Plaintiff's Exhibit 58, which is on the easel in front of you, if that's helpful.

A. Okay. So, for example, to the best of my ability, on this particular day, you can see there are some plumes sort of lining up along the southern border of Tennessee there.

The map just moved on me. Okay.

So let's look at the one which is probably near Memphis, Tennessee, and that's perhaps the plume from Allen power plant; and then moving further east, you can see -- that was

the Allen plant there. Moving further east is probably the plume coming from Colbert; and moving further east still is the plume from Widows Creek. And you can even identify within -- keep in mind that these plumes pass over other power plants; plumes are combined and make a big cloud of air pollution. But you can even see the other plumes, a little bit buried, but you can see, for example, there's a, you know, a -- see if this works.

You can see a plume over there. You can see a plume over there from the Kentucky power plants. You could probably see a plume coming here, it looks like from John Sevier.

But when you do this every day, you can individually see plumes from every power plant many times during the year. You can see where they go and which are the states being most impacted by that particular power plant.

Having done this for the whole year, I can say that every single power plant in the fleet has impacts in Tennessee, in the states where they reside, Alabama and Kentucky, and in North Carolina and throughout the region.

Q. Let's move on to Plaintiff's Exhibit 155 and ask you to identify that.

A. This is a plot which is -- again, now we're looking at the peak 8-hour ozone impact and/or benefits. Again, this is the flip side of the same coin. And this is showing the

whole study area that we had looked at.

And I want to really focus in and look at what the color scale means here. So if we can zoom in and blow that up, that would be great.

That's a little too big, I think.

Okay. So what's really important to recognize now is how did I reach the conclusion that these impacts were substantial? Well, let's start talking about the evidence that says it's substantial.

On the scale in front of us here, you can see that the gray means the impacts were less than one half of a part per billion; and then you move up and you see the blues get darker and darker, all the way to up to where the darkest blue is greater than 8 parts per billion. Well, 8 parts per billion doesn't sound like a lot. It sounds like something really small, so I think it would be useful to put that scale into context.

So, what most people don't know when I give these talks around America is that ozone is a naturally occurring blue. You know, much like the other day, I think it was Bill Jackson testified that the Blue Ridge Mountains got its name because there is natural a blue haze in those mountains from natural sources of pollution. There is also natural formation of ozone. And in this country, the natural background ozone level is about 40 parts per billion. In

this country, the ozone standard is about 75 parts per billion. So what that means is man-made pollution is contributing, or is allowed to contribute, by the USEPA standards, only another 35 parts per billion.

So when we compare this scale, for example, to 8 parts per billion ozone, we're really comparing it to about a 35. So what fraction of that 35 that was, you know, sort of theoretically allowed to emit, although I don't -- I think we would agree that we shouldn't be emitting any; we all ought to make pollution as low as we can. But what fraction of that 35 are we talking about? And that's one of the ways of determining whether something is substantial or not; is it a significant fraction of that available capacity, if you will.

So let's look at this map for a moment. If you look, you will see that there are centered on each power plant, because of the NOx emissions, dark blue and the second to darkest blue patterns on each of those power plants, and the darkest blue is 8 or greater parts per billion. Well, 8 compared to 35, that's about 25 percent of the problem is just from these power plants.

So that's one way I decide whether something is having a substantial impact or not.

So when you look at this map, you can identify, again, as I did earlier on the PM map -- you can say which power plant is at the center of each of those -- which TVA

coal-fired power plant is at the center of each of those dark blue pattern areas.

And we can walk through that, if you'd like, Your Honor. But I think the point is each of those power plants is at the center of one of those dark blue areas.

You can also -- and we have a subsequent exhibit that will show that. We'll zoom in and see what those impact areas are within those dark areas, those nonattainment areas, wilderness areas, Class 1 areas, and go into details on that.

We'll go into that in more detail. That includes looking at, you know, natural resources, nonattainment areas, and sensitive receptors.

Q. Can you identify a few of the TVA power plants on this figure for us?

A. Certainly. So, again -- I'll try to use the screen here -- you can see the dark blue area here, which appears to me to be the Colbert power plant area of impact. The dark blue area there appears to be the Widows Creek plume impact area. The large one up in northeastern Tennessee would be the John Sevier power plant impact, you know, just to name a few.

Q. All right. And then you have another slide, which is the second page of Plaintiff's Exhibit 155. And can you tell us what this one is?

A. What we're trying to do with this one is basically zoom

in now. This is exactly the same figure we just saw but we're zooming in much closer now.

So you can see the power plants themselves are labeled on this plot. As well, we have identified the nonattainment areas for the 8-hour ozone standard, and it's quite evident from this plot that several of these power plants are having direct impact on ozone nonattainment areas.

In Tennessee, for example, if you look at Gallatin, that would be the Nashville area nonattainment. John Sevier is having impacts on nonattainment areas in that area. Widows Creek is having impacts on the Chattanooga nonattainment area in Tennessee, actually crossing the state lines there.

So you can see that these power plants are having direct impacts on areas that are considered by the U.S. Environmental Protection Agency as nonattainment of the National Ambient Air Quality standards.

And I'd like to point out that our eye just naturally focuses in on the most darkest blue areas here, but to be clear, everything you see on this map is not gray, so everything you see on this map are impacts. So remember, look at the scale, and the scale is showing you what those impacts are. But everywhere in this area is at least greater than 1 part per billion, and some of them are greater than 8 parts per billion.

Q. And these are the nonattainment counties as of the time

you did your report?
A. That's correct. The USEPA, in conjunction with the states, are continually evaluating the attainment status of each county that has monitors.
Q. In fact, there's been a lowering of some of the ozone standards recently?
A. That's correct. The ozone standard itself was changed from 85 to 75, and then counties need to be redesignated based on these new levels. So that's actually going on as we speak. So many more counties will likely be nonattainment in the future with these new tighter standards.
Q. Now let's go to Plaintiff's 156. And please describe what this one shows.
A. Okay. What we've done now is really zoom in. So now we're just focusing in on eastern Tennessee and western North Carolina. And what I'd like to do is walk through specifically many of the resource areas that are being impacted by these power plants.

In particular, let's start at the northern end of the map here. These are ozone impacts. So we have John Sevier. Then let's look at the impacts from John Sevier.

And, again, let me emphasize, I'm sort of focusing in on sort of the blue areas here, but the whole map is impacts. But what we're trying to do is really focus in, just to get a sense of what are the sensitive resources being impacted. So

let's start at the northern part of the state.

Well, first of all, let's step back. On this map are some green hatched areas, and those represent the forest and the wilderness areas throughout the area. In this case, those are the national forest. We've also identified state parks; we've identified national parks. You can see the Great Smoky Mountains National Park identified in sort of a double hatched green area. But those are all the national forests. And as we heard from Mr. Jackson the other day, there are certain forests that they're particularly concerned about, but they're concerned about all the forests in the area.

So let's work our way through some of these sensitive receptors and look at the actual estimated impacts from John Sevier on those locations.

So, for example let's look at Grandfather Mountain. You can see on our prediction here that Grandfather Mountain is in sort of the second darkest blue area there, which means the impacts on Grandfather Mountain are somewhere between 4 and 8 parts per billion at that location.

I'd like to say that Grandfather Mountain, for the record, is rather unique. It's been accepted as a UN biosphere reserve because of the number of rare species of plants and animals at that location. I'd also say the Great Smoky Mountains is also a UN bio-reserve. Those are very

unique resources.

If you move further south, you have Linville Gorge; you have Mount Mitchell, the highest mountain east of the Rockies. Mount Mitchell, for example -- you know, if you take a hike on Mount Mitchell --

MR. FINE: Your Honor, I think we're going far beyond Mr. Chinkin's area of expertise. We're going to have other witnesses, at least they're listed on the plaintiff's witness list, who can describe these areas from their own knowledge or experience. I don't think we need to hear Mr. Chinkin give us his description of these areas.

MR. GOODSTEIN: Your Honor, we've qualified Mr. Chinkin in air quality analysis, including emissions inventories. This is important evidence, Your Honor, that we need to work through and get into the record. And I don't know what else we can do to lay a foundation for it. He's an expert in the impacts of air pollution.

THE COURT: All right. Go ahead.

MR. GOODSTEIN: Thank you, Your Honor.

THE WITNESS: Okay. So I was talking about Mount Mitchell, I believe.

BY MR. GOODSTEIN:

Q. Yes.

A. Mount Mitchell was an example of the important resources in the western North Carolina area, and what I was going to

say was, if you go on a hike up Mount Mitchell, you'll see more trees than you will see if you hike from Georgia to Canada; you'll see more trees and plants than if you go through all of Europe. There's a unique geology and plant life development and animals in this area. This is a unique area of the entire country. So when I'm looking at weighing substantial impacts, I'm keeping that in mind as well.

Moving further south, we can see the Great Smoky National Park itself is in the area between 4 to 8 parts per billion impact of ozone just from John Sevier.

There are also probably impacts from Widows Creek. It's just, remember, this is a composite of all the power plants' impacts, so it's difficult to isolate on this figure.

And I just want to point out that the Great Smoky Mountains National Park, as we'll talk about in more detail later, has considerable concerns. The land managers for the Great Smoky Mountains National Park have considerable concern about the air quality impacts in the Great Smokies.

And just to be complete, I don't want to leave out Asheville, you know, where we are here today. The Biltmore Estate. Those impacts are somewhere between 2 to 4 parts per billion of ozone.

The Pisgah National Forest. Joyce-Kilmer, one of the virgin forests of America still standing. Joyce-Kilmer is in the area of ozone impacts from both Widows Creek and John

Sevier. The Cherokee National Forest. Gorges. And I could go on. Shining Rock. All these areas, very important resources, most are being impacted. Great Smoky Mountains, the most visited national park in America, is in an impact area from these power plants.

Q. All right. Take a look at your closeups for PM2.5, Mr. Chinkin. And you can start at Plaintiff's 148 in evidence.

A. Well, similar to what we just talked about for ozone, we have here our whole study area looking at the impacts from the TVA coal-fired power plants on PM.

Again, PM is important for a number of reasons: Visibility, air quality, health effects, and then, ultimately, acid deposition.

So, again, looking at the big area, and then we'll focus in, just like we did with ozone. You can see there is a scale, and the scale is again gray to a dark blue. The gray area means the impacts are less than .05 micrograms per cubic meter and the blue areas -- darkest blue means it's greater than 0.4 micrograms, or rounding, about a half a microgram or greater.

And, again, to put this into context, the air quality standard for particulate matter is 15, and there is a background level of particulate matter in this country as well. It's estimated to be somewhere between 4 and 5, maybe

as high as 6 micrograms per cubic meter as a background. So man's contribution is maybe 10 micrograms of that 15. And what's really important to keep in mind whether an impact is substantial enough for PM in terms of the Ambient Air Quality Standards, is how close are you to those standards. And if you look at places in this part of the country that are in violation of the National Ambient Air Quality Standards, they're actually pretty close to the standard. In fact, they're very close. You can be nonattainment of the standard if you're annual average PM2.5 is 15.1 or 15.2 or 15.3, and there are many areas that are that close to the standard, yet they violate, which means they have to spend considerable amount of money in resources to control sources in their area to get below the standard. So these levels of 0.2, or .3, .4, those are really important substantial impact levels.

Q. What's the implication of the CAIR decision to the projections for attainment for various caps?

A. Well, that's a really important issue. When the CAIR modeling was performed by the USEPA, much of the country rejoiced at the results because they didn't have to do much to attain the standards. The CAIR program would take care of it for them. By major sources in this country controlling their NOx and SO2 emissions under CAIR, the modeling showed that many areas would attain the standard without any additional controls. So now, in the absence of the CAIR

program, many more areas of this country will remain nonattainment and have to implement considerable control programs at very costly levels.

Q. Do you have a similar close-up for PM2.5, as we looked at for ozone, on the second page of Plaintiff's Exhibit 148?

A. Yes, I do.

Q. So let's direct your attention to that, please. And can you tell us what this one shows?

A. Well, what this shows, again, is the PM2.5 impacts from the TVA coal-fired power plants. It also shows, highlighted, the nonattainment counties. We've also identified the power plants by name here.

And one thing I want to point out is this map doesn't have sort of the bulls eye splatches that ozone did because we're looking at an annual average of the PM impacts. So that tends to smear it out somewhat from the day-to-day variations. And ozone is more of a close-in phenomenon. As you can see, each power plant had its ozone impact area specifically. In the sense of PM, they tend to kind of all merge together in a sense, sort of dependent upon the wind patterns, if you will.

As you can see, there is a sort of a skewedness to this pattern that tends to move things from the west to east in terms of the concentration pattern, with the worst impact being along the, sort of the Appalachians on the western side

there where you can see Kingston; and Bull Run and John Sevier are the darkest blue areas, where the impacts are on the order of greater than .4 micrograms per cubic meter.

But you can see that there are impacts at Colbert, in Alabama. You can see Widows Creek in Alabama as well. You can see these impacts in Kentucky. You can see the impacts going into the North Carolina, South Carolina and Georgia, throughout the area.

Remember, as long as it's not gray, these are impacts of significant levels.

Q. And what are the counties bordered by the black line in this picture?

A. Again, these black line counties are the nonattainment counties. So, for example, you can see -- let me clear this here. So you can see on this one here in the Knoxville area, around Kingston and Bull Run, are nonattainment areas. And so, again, these power plants are having impacts, direct impacts, on nonattainment areas.

You can see Widows Creek is having an impact on PM2.5 nonattainment areas just slightly downwind from Georgia and Tennessee.

Q. And we're looking at the impacts of TVA's excess emissions in these figures?

A. That's correct.

MR. FINE: Your Honor, I'm going to have to once

again object to the argumentative nature of that question.

THE COURT: Overruled.

BY MR. GOODSTEIN:

Q. So let's go to the further close-up, Plaintiff's Exhibit 149 in evidence, and please explain to us, Mr. Chinkin, what this one shows.

A. Similar to the zoomed-in version of the ozone map, we've now zoomed in on the PM impact map. And, again, these are impacts from TVA's coal-fired power plants. And using similar color scheme and plotting scheme, in the green hatched area are the national forests, in the sort of the blue scale are the impacts, the power plants again have been identified. We've identified the state parks. We've identified the sensitive receptors, such as Grandfather Mountain, as we did before, Shining Rock Wilderness, et cetera, Joyce-Kilmer and Slickrock.

Q. And the Blue Ridge Parkway and Appalachian Trail is also on this one.

A. Yes, that's correct. That was on the ozone map as well. I forgot to point that out. Let me see if I can do that here.

I'm trying to point out the Blue Ridge Parkway. Kind of goes along down through here, and then the Appalachian Trail goes along through here.

And what I'd like to do is point out the air quality

impacts, in this case for PM, from TVA's coal-fired power plants on these sensitive receptors.

And similar to the ozone plot, it's important to keep in mind the scale. There is nothing that's gray on this, so everywhere is being impacted; it's just a question of how much impact are they having. And you can see that as far east as two nonattainment counties in North Carolina, Catawba and -- Davidson County, Catawba, and, actually, a third one, Guilford County, are in blue areas.

Let's talk about those. You can see that the farthest east is in sort of a light aqua blue, if you will, and .1 to, looks like about .2 maybe, PM2.5 micrograms. You move to the west, you see Catawba County is in the darker blue area, so it's even greater. That looks like the .2 to .3-microgram area. So if, for example, Catawba's design value, which is the level the EPA says it's currently having, is 15.2, well, if you could subtract off the .2 to .3, they would be attainment. So that's a significant impact in a nonattainment area.

Looking at the sensitive receptors, you can clearly see the Blue Ridge Parkway I've drawn and the Appalachian Trail are going right through some of the highest impact areas. The greatest impact areas are actually in Tennessee, in Knoxville and the areas surrounding John Sevier. But there's impacts throughout the area, through all the sensitive

receptors.

The Great Smoky Mountains is in the second to the darkest blue areas, so it's .3 to .4 micrograms in the Smoky Mountains.

Q. What are the concentrations in the plume coming off of the John Sevier and these other power plants, what are the concentrations that you see as far as impacts on the Appalachian Trail and on the Blue Ridge Parkway?

A. Okay. Let's go back up and look at John Sevier's area, which -- I'm going to get too many lines in here and we won't be able to see them all. But if I can circle that area, you can see that there are sort of two dark levels of blue now crossing over now the Blue Ridge Parkway and the Appalachian Trail, and those levels are quite substantial. That's greater than .3 micrograms per cubic meter of PM2.5.

Q. If you would try to go a little slower, Mr. Chinkin, that might help the court reporter and help keep our record straight.

A. Thank you. Sorry.

Q. Sure. And what does this show you about the nonattainment areas that are being currently impacted by TVA's excess emissions in states outside of North Carolina?

A. So let's clear the lines on the map and look at -- it's a little hard to see on this map, so I'm going to circle it. In the Knoxville area, there are a number of nonattainment

counties that are shown in a gray line, but you can see that in the Knoxville area, the combination of Kingston and Bull Run's impact is greater than the .4 micrograms I spoke of, or greater than about a half a microgram, in that nonattainment area.

Q. How would you describe that impact on nonattainment areas, in your experience?

A. My experience has been that a half a microgram impact is huge, frankly. It would take many, many, many control programs of many, many sources to achieve that level of reduction. And in this case, we can get that level of reduction by just controlling the emissions from two facilities.

Q. And with regard to the Chattanooga area, can you describe the impact that the Widows Creek plant is having on Chattanooga?

A. Okay. So, similarly, I'm going to draw a circle around that. Again, there are shown -- it's hard to see on my image, but there are some gray lines there identifying the nonattainment counties surrounding Chattanooga, and you can see the Widows Creek power plant just to the southwest there.

Try that again with my arrow. And those impacts are on the level of the next darkest blue, so those are greater than .3 micrograms per cubic cube.

Q. Widows Creek is actually located in Alabama; is that

correct?

A. That's correct. So it's actually crossing state lines, having impact on the nonattainment area both in Georgia and in Tennessee.

Q. Could you show us where the nonattainment areas in Georgia that are being impacted by Widows Creek current emissions are located on this figure, please?

A. I think --

MR. FINE: Your Honor, I'm somewhat puzzled by this testimony. I have to interpose an objection as to relevance. It's my understanding --

THE COURT: I sustain the objection. Let's stick with North Carolina and primarily the concerns in this case.

MR. GOODSTEIN: Your Honor, there are a lot of impacts and benefits from this control program throughout the region, Your Honor, and so we think it's very important that the Court see all the information, particularly in the states where these plants are located. There are going to be very substantial benefits and they're having very substantial impacts.

So this evidence is relevant, Your Honor, not only to liability, because it confirms and firms the traceability of this pollution --

THE COURT: Well, we are talking about Alabama and we are talking about Kentucky, and, certainly, I'm interested

in Tennessee and western North Carolina, in fact, the whole state of North Carolina, but I'm not particularly interested in Georgia and these other states.

MR. GOODSTEIN: All right, Your Honor.

THE COURT: Those are the areas that seem to be involved primarily in this lawsuit, the ones that I named.

MR. GOODSTEIN: Well, Your Honor, I think the evidence that we've received so far, respectfully, and the evidence that you will receive is going to show that this is a regional issue, and that you have to look at --

THE COURT: I understand that.

MR. GOODSTEIN: -- the cost and the benefits on a regional basis, Your Honor. So we just want to make sure the Court has the complete picture of what -- how substantial these impacts are, not only on a magnitude basis but also on a geographic area.

THE COURT: But we don't need excessive detail as to these other states. So let's move on.

MR. GOODSTEIN: All right. Thank you, Your Honor.

BY MR. GOODSTEIN:

Q. Mr. Chinkin, you've also had an opportunity to review the modeling performed by TVA's experts.

A. Yes, I did.

Q. So you've reviewed the several reports that have been issued by Dr. Tesche and Mr. Mueller in this case.

A. That's correct.
Q. And you reviewed their comments regarding the work that you did with Mr. Wheeler at STI in support of North Carolina's case here?
A. That's correct.
Q. And how did their modeling influence your analysis?
A. In reviewing their reports, I would first say that their criticisms of our work didn't change our conclusions at all. In fact, looking at their work was supportive of our conclusions when you put their work in the proper context.
Q. All right. And did you prepare some figures which show how, when properly interpreted, TVA's modeling supports your conclusions?
A. Yes, I did.
Q. I'd like to refer you to Plaintiff's Exhibit 173.
Can you explain to us, Mr. Chinkin, what this figure shows?
A. Sure. This is a figure from the Dr. Tesche and Mueller report, and it is showing their modeling results for TVA's contribution to annual average PM2.5, and these were determined by their modelers using a technique called zeroing out, which means remove TVA's coal-fired emissions from the modeling run, hold everything else constant, and see what that delta or what that impact is from their power plants.
Similar to ours, they have a scale. So you can see a

color-banded scale on the left. And that scale runs from zero to one microgram in this case.

And what you can see based on their modeling results -- and they actually modeled year 2002 and called that their current impact assessment. And in 2002, this plot shows their impacts throughout the region, in Tennessee, Kentucky, Alabama, North Carolina, et cetera. And what I'd like to point out is that it is very similar to our findings that I was just describing. And I will point out, specifically, if you look in western North Carolina, you can see there are some areas of a third level of blue, if you will, up, and some sort of greenish areas, and those areas, if you look to the scale, are the same order of magnitude of our impacts from our modeling about one half of a microgram.

So, in fact, TVA's experts, in their report, show the same impacts that we calculated using our model.

Q. All right. And have you had an opportunity to also, in your work on this case, Mr. Chinkin, to look at the modeling that was produced by the SAMI report?

A. Yes, I did.

Q. And how does that compare to your conclusions in this case?

A. We spent quite a bit of time in the last several days talking about SAMI and its extensive modeling efforts, and I reviewed those modeling results, and, in fact, those have

similar corroborative findings. I think it's important to go through those carefully, reminding everybody that SAMI's approach was to assume a 10 percent reduction in emissions by a state and to see what those impacts would be in downwind states.

As we have heard discussion of in prior testimony, TVA makes up a lot more than 10 percent of Tennessee's SO2 emissions, so it's important to quantify, using the SAMI results, what TVA's impacts would be separate from just saying what would a total state's impact be. But I'm prepared to do that if we want to do that.

Q. So I'm going to refer your attention to Plaintiff's Exhibit 171 and ask you to identify that.

Are these the same plots that were contained in your letter report which is now in evidence?

A. That is correct.

Q. Without going through every single one, can you show us a few examples that we can have blown up?

A. Sure. I'd just like to show a couple of these, maybe three or four at most, to give a sense of the spatial extent that SAMI calculated the impacts by reducing all of Tennessee's emissions by ten percent. And keep in mind that TVA makes up about, give or take, 70 percent or so of Tennessee's SO2 emissions. So if you reduced those emissions by only 10 percent, these maps show what that impact would

be.

So what I'd like to do is to go to the center top one, which is dated July 15th, and blow that one up, and then also, if we could bring the scale along. Let's look at the scale, and you can see on the scale, the top darkest blue color is about a half a microgram, .55, and it ranges down to sort of the gray, which is basically no improvement, and you can see with just a 10 percent change of Tennessee's SO2 emissions there are about, by their estimate, a half a microgram improvement in western North Carolina. Again, very consistent with what TVA's experts are saying, what our modeling is showing.

There is just a couple other days, I think, that are worth noting. If you look at, it's dated July 19th, second one down on the left, I'd like to point out that, you know, here is a day -- and we've heard lots of testimony about how SAMI wasn't able to model the entire year, they didn't have the technology in those days and the computer power we have today. But in this episode, there are, in fact, no impacts from reducing the Tennessee SO2 emissions in Tennessee, and that's because -- I just want to make sure it was highlighted -- that the SO2 emissions that come from power plants, it takes time for those emissions to convert to SO4 sulfate particles.

So on this particular episode, the benefits accrued by

reducing emissions in Tennessee are actually in western North Carolina, South Carolina and Georgia. There actually aren't benefits in Tennessee that day. So it's a pretty complicated problem, a regional problem. You have to consider how long it takes the pollution to transport and transform in the atmosphere.

Just a couple of, or maybe one more day. Just go one down. It's dated May 12, 1993, again, showing another PM event chart. And you can see again on this scale that there are major impacts in this case in Tennessee and in Kentucky and in Virginia and western North Carolina.

So, again, SAMI, down about a half a microgram impact from these controls, similar to TVA's experts, similar to our work.

Q. And while we're talking about SAMI, Mr. Chinkin, did you hear the testimony about the memo that was read into the record yesterday?

A. Yes. The memo that was referred to was work done by our former president, Mr. Fred Lurmann, and Mr. Wheeler. I think what I'd like to add to the comments that were made yesterday is that we were hired by SAMI at the end of the SAMI project to do a critical review so they knew how to do it better the next time. It was not an intent to say that the modeling was not useful. I think that was a mischaracterization.

Q. Did you also have an opportunity to review the modeling

that was used to support the Clean Air Interstate Rule by USEPA?

A. That's correct.

Q. And what did that show about your conclusions in this case?

A. The air quality modeling done by the USEPA for CAIR was more modern. It used similar tools to that which we used in this case, the CMAQ model; and, similarly, they did some sensitivity runs, where they looked at the impacts by zeroing out each state's emissions and seeing what those impacts were in downwind states, similar to how we zeroed out -- or TVA zeroed out TVA's power plants to see those impacts. It's a very common approach for looking at air quality impacts. And I have tables that will show that they calculated approximately a half a microgram per cubic meter of impact in North Carolina, similar to TVA, similar to SAMI, similar to our results.

Q. I'd like to show you what's in evidence as Plaintiff's Exhibit 11. Can you identify that document for us?

A. Yes, I can.

Q. All right. Now, this is a very large table, so if you could navigate us through it to the pertinent information, we can have that blown up on the screen, and that might be the best way to look at it, if you don't mind doing that Mr. Chinkin.

A. Okay. So I think what we need to go to is page 10 of this exhibit.

Q. And if you could identify for us again, for the record, what this document is, and then we'll go to --

A. Okay. I'm sorry. Go back to page one 1.

This is the technical support document for the final Clean Air Interstate Rule, and this is from the USEPA. In this particular document, if you go to page 2, is an appendix, Appendix H to that document, and it provides quantified detailed impact assessments for all the nonattainment counties in the eastern United States, and so it's a very large table. That's why we're focusing in on just page 10.

Q. How does this USEPA air quality modeling support your conclusions in this case?

A. Okay. Well, if we look -- if we can zoom in. Oh, we're not there yet. Let's wait for page 10.

MR. FINE: I rise to interpose an objection, but I'm not sure what page number they're actually -- that may be your electronic page number.

THE WITNESS: Should I read the Bates number? Would that be helpful?

MR. FINE: That would be very helpful, Mr. Chinkin. Thank you.

THE WITNESS: On the bottom of this page, it says

NC00244721.

MR. FINE: Thank you, Mr. Chinkin.

The one actually on the screen seems to be 720.

THE WITNESS: I don't think that's the right page. Can we move that down a little? That's not the right page yet.

MR. GOODSTEIN: So it's the one with the short table on it.

THE WITNESS: It's a short table, with "Tennessee" as the first row.

MR. GOODSTEIN: Okay. Everybody have it?

And it's also up on the screen.

BY MR. GOODSTEIN:

Q. All right. Mr. Chinkin, can you explain to us what this shows?

A. I'm sorry. This may not be the right page. What we want -- I'm sorry. We want the page -- this tag may have been moved. We want the page that shows "North Carolina" in the left-hand column. There it is. It's the page before that. I'm sorry. It is 720.

Q. All right. Here we go.

A. Okay.

MR. GOODSTEIN: Sorry about the confusion, Your Honor.

THE COURT: All right.

BY MR. GOODSTEIN:

Q. All right. Focus us in, Mr. Chinkin, on the pertinent information on this page, now that we found the page. I know it's a very large table, so --

A. It's a very large table, but all we need to look at, really, are two rows. And if you go on the very far left column, where it says "states" in the downwind nonattainment county columns, you'll see there are two rows for North Carolina, one row for Catawba and one row for Davidson County nonattainment areas. And if we move to the right, what the table shows is the quantified impact estimated by the USEPA in micrograms per cubic meter from zeroing out all of Tennessee's SO2 emissions, and you can see the results show a .62 micrograms for Catawba County and a .30 micrograms for Davidson County.

Now, I remind you, this is zeroing out all of Tennessee's emissions. TVA comprises about 70 percent, if we want to make an estimate, of their SO2 emissions. So I'm saying that the impact is somewhat less than the .62 because it's not 100 percent of the SO2 in Tennessee, but it certainly is supportive of about a half a microgram of impact from TVA's coal-fired power plants in North Carolina's nonattainment counties. This is USEPA saying this.

I would also like to point out, there was conversation yesterday about how reliable models are, and as you can see

on this table, just looking at any random number you want, EPA reports these numbers to the nearest one-hundredth of a microgram per cubic meter. You can see just above Catawba County is New York, New York, and they show 0.06. That is six one-hundredths of a microgram. The one above that is 0.07. That is one one-hundredth more. That is seven one-hundredths of a microgram. So this is very common practice by USEPA, as well as we did in our model, to report data to one one-hundredth of a microgram.

Q. There was some comment yesterday about how monitored values compared to model values. Are these results in the modeling that we looked at this morning from these various sources consistent with monitored results?

A. They're consistent. And it's really important to understand that there are differences between monitored data and modeled data. You know, I've given a lot of thought of how to explain to the public in general how to understand air quality, because it's a complicated topic area, and I think several examples I can come up with that will hopefully help explain why we have confidence in these values at these levels would be to think of, growing up as a child, using a thermometer. We all had mercury thermometers as kids. Your mom would shake it and then stick it under your tongue and try to measure your temperature. Well, today we don't do that. Today we have digital thermometers. You stick

something in your ear or you put it on your forehead, and it reports your temperature to two decimal points. Far more accurate technology.

Well, maybe the technology for air quality hasn't quite developed as quickly as modern computer technology has. That doesn't mean you don't believe the modern computer technology results. In fact, I actually have more confidence in the modern technology than the monitoring data technology.

I also want to point out that modern PM measurement techniques are required to measure to the nearest tenth of microgram, which is only one order of magnitude greater than the modeling, which is at one one-hundredth of a microgram. I think there was some confusion yesterday saying that it was several orders of magnitude different. It is not. It's only one order of magnitude different.

I'd also like to point out that if you think about what a model is doing, a model is a grid. It represents, say, ten miles on a side, and if you think about, you measure one value on one side of the grid and another value on the other side of the grid. Let's say it's 10.5 here and it's 10 over here. Well, you know there's not a wall. It's 10.5 and it's probably 10.4, 10.3, 10.2. Models are able to interpret that. We can't afford to put air quality monitors in every possible spot to measure everywhere, but models can do that for us. They're a very powerful tool to understand very

accurately what the air quality is in an area, in fact, much better than monitors can.

Q. And that's why USEPA has used modeling like this just for their air pollution regulations.

A. That's correct.

Q. And that's why SAMI used modeling.

A. That's correct.

Q. And that's why you're using the same type of approach for this case.

A. That's correct.

Q. Now, you also mentioned, Mr. Chinkin, that you looked at the types of resources that were being impacted as part of your conclusion that TVA is currently having a very substantial impact on air quality of the region.

What types of information about resources did you consider in arriving at that conclusion?

A. Well, similar to other studies I've done around the country and around the world, I use publicly available information. I tend to rely on governmental reports. And that's what I did in this case as well.

Q. I'd like to show you Plaintiff's Exhibit 176, which should be an official report issued by the National Park Service on air quality in the national parks.

Can you identify this?

A. Yes, I can.

MR. GOODSTEIN: And, Your Honor, if I could approach, we have a certified copy of this and another official report from the National Park Service.

THE COURT: All right, sir.

MR. GOODSTEIN: And, Your Honor, you could put those in your book. They have three holes on the side, but those are original copies and they've been certified as a public record by the National Park Service.

THE COURT: Okay.

BY MR. GOODSTEIN:

Q. Mr. Chinkin, can you explain how you considered this information, these official reports from the National Park Service, in your analysis of the current impacts of TVA's emissions?

A. Okay. As I think I said at the beginning, I view the -- one way to value the substantial nature of the impacts is looking at air quality standards. We've talked about that. Another way to value the substantial nature of these impacts is what resources are being impacted.

So I've looked at this report from the national parks and put out by the National Park Service and looked at what they had to say about their concerns about air quality in the national parks. And this report is somewhat amazing, if I can use that adjective, in that this is a report on the entire country, air quality in the national parks, and for

the entire country, they have lots of national parks that they are managing, but they have devoted an entire chapter of this report to the Great Smoky Mountains National Park. It is the only national park that has its own chapter devoted to it by the National Park Service. Their concerns about the air quality impact in this park are tremendous.

And what I'd like to do is to walk the Court through the chapter on the National Park Service's estimates of air quality impacts on the resources in the Great Smoky Mountains.

MR. FINE: Your Honor, I believe if the document is coming into evidence, it will speak for itself. I'm not sure that we need Mr. Chinkin to take us through it.

MR. GOODSTEIN: Your Honor, we're not going to read anything. We just wanted Mr. Chinkin to point out a couple of parts of this report, particularly the chapter on the Great Smoky Mountains National Park and the air pollution impacts that are currently going on there, and point the Court to the particular areas that he considered most important in his analysis.

THE COURT: All right. I'll let him proceed. Objection is overruled.

MR. GOODSTEIN: Thank you, Your Honor.

THE WITNESS: So if I may highlight a few areas of this.

BY MR. GOODSTEIN:

Q. Yes.

A. Let's look at Chapter 4, and let's start off with just the title of the chapter. "Great Smoky Mountains National Park Threatened By Air Pollution."

Q. Just take it slow just for the record.

A. Okay. What you can see, throughout this chapter, the National Park Service has highlighted a number of critical parameters of concern. There are sections that will cover ozone impacts, visibility impacts, acid deposition impacts, and air quality effects on the public in the national park.

And I just want to point out that the National Park Service considers the Great Smoky Mountains National Park the crown jewel of the national park system. It is visited by more visitors than any other national park.

There are a number of conclusions throughout this chapter. I'd just like to highlight a couple.

For example, the National Park Service says the current summer average visibility in the National Parks, in the Great Smokies, is about --

THE COURT: What page are you on?

THE WITNESS: Okay. I'm on page No. 36, Your Honor. It has a pie chart on the left-hand column.

THE COURT: All right. Hold on just a minute.

Yes, I'm with you.

THE WITNESS: In the middle of the right-hand column, they're discussing visibility impacts, and they point out that their estimate of the current summer average visibility is 15 miles. And they go on to state that, in the absence of human-caused air pollution, it should be 77 miles. So the visibility is being dramatically impacted by air quality.

BY MR. GOODSTEIN:

Q. And does the Park Service in this report conclude what the vast majority of those visibility impacts are attributed to as far as an air pollutant?

A. Yes, they do. And at the bottom of that paragraph it says that they have concluded that the primary source is the burning of sulfur coal in eastern power plants and in industrial facilities. That's the National Park Service's conclusion.

Q. And what does the pie chart on the left side of that page show?

A. Well, the pie chart is a scientific way of looking at what is contributing to the visibility impact, and what it shows is that 83 percent of the visibility impact is coming from sulfates, which are the converted SO2 from coal-fired power plants.

Q. And based on your experience, what is the major source of sulfates in the Southeast?

A. Coal-fired power plants.

Q. Like TVA's coal-fired power plants?

A. That is correct.

Q. So you've been able to conclude from this that TVA's current emissions, their excess emissions from their coal-fired power plants, are having a substantial adverse impact on visibility in the Great Smoky Mountains National Park?

A. That's correct.

Q. Can you show us what other findings in this official report from the Park Service that you considered important in reaching your conclusions?

A. Okay. If we turn to the next page. Again, this is just highlighting it. This is the section dealing with acid deposition in the National Park. And without going into the details, this section describes in a very quantifying way how much impact acid deposition is having on the streams and on the plants in the Great Smoky National Park.

MR. FINE: Your Honor, again, very mindful of the Court's prior rulings on the subject, but for the preservation of the record, we'd interpose an objection about any testimony concerning sulfate deposition.

THE COURT: Yes. Overruled.

BY MR. GOODSTEIN:

Q. Did you give us a page? I'm sorry, Mr. Chinkin.

A. Oh, I'm sorry. It was the next page. That was page No. 37, was on the deposition.

Q. Okay. And what were the findings of the National Park Service regarding the impacts of deposition on the Great Smoky Mountains National Park?

A. Their overall finding is that the Great Smoky National Park receives some of the highest rates of nitrogen and sulfur deposition of any monitored site in North America.

Q. And based on your analysis in this case, are TVA's excess emissions from their coal-fired power plants contributing to that deposition in the Great Smoky Mountains National Park?

A. Yes, they are.

Q. And how do you know that?

A. We have modeling results that we could show that will show their impact on acid deposition.

Q. Let's finish going through this report first, please, Mr. Chinkin, and if you can just highlight the other portions that you considered particularly important in your analysis.

A. Okay. There's just a couple more I'd like to highlight. One is on page 39.

On page 39, you see some photographs that the National Park Service has taken showing the damage to the foliage from ozone. And there are some comments throughout the section about how sensitive the plants are to ozone damage and

that -- there is also data in this chapter showing that, by their estimate, the National Park Service has estimated that there is no location with more ozone impact in eastern America, east of the Rockies, than the Great Smokies National Park, second only to Atlanta.

Q. And based on your analysis, Mr. Chinkin, are the excess emissions from TVA's coal-fired power plants contributing to that ozone pollution at the Great Smoky Mountains National Park?

A. Yes, it is. We can see that on the poster here that we show in the previous exhibit. The impact from the John Sevier is right into the Great Smoky Mountains National Park.

Q. And you're referring to Plaintiff's Exhibit 156 that's in evidence?

A. I can't see the number, but it's -- I could confirm that.

Yes, that is correct, 156.

Q. Anything else from this report that you want to highlight for us right now?

A. No. I think that concludes my comments on that report.

Q. All right. You also considered an air quality folio that was issued by the Great Smoky National Park yourself in your analysis.

A. That's correct.

Q. I'm going to show you Plaintiff's Exhibit 174 for

identification. Can you identify that?
A. Yes. That is the Great Smoky Mountains National Park management folio that I reviewed.
Q. And can you tell us what you know about how this report is prepared and issued by the National Park Service?
A. Well, the first report that we just talked about is prepared, you know, not very frequently, because it's a major report, but these folios that are put out by the individual park come out more frequently. And this particular one -- it's kind of hard to see on my copy, but I believe this is revision 3/2006 version of this folio, so it's updated periodically with what their concerns are about air quality.
Q. And in particular -- so this is another official report by the Great Smoky Mountains National Park?
A. That's correct.
Q. What, in particular, in this folio, Plaintiff's Exhibit 174, did you consider important in your analysis?
A. There's just a couple things I'd like to highlight from this folio. One is the title of the section, on the second page -- and I can't quite see a page number. I'm not sure if it's numbered. It's the page that shows the photographs with and without air pollution. But what I'd like to highlight is the section entitled, "Ground Level Ozone Pollution Threatens People and Plants."
And I'd like to point out that, you know, even though I

study air pollution, that's my job, all around the world, I value natural resources wherever they are, and I visited the Great Smoky Mountains, and the "Great Smoky Mountains Official Newspaper and Guide For Visitors" that I picked up last Thursday, the title story: "Is The Air Okay To Go Hiking Today?" I found that shocking, to go to the crown jewel of national parks and I probably shouldn't be hiking that day.

"The Ground Level Ozone Pollution Threatens People and Plants." I don't think I need to say any more about that section of the report. It's a critical problem.

There is one other thing I'd like to highlight in this report, not on ozone, but --

Q. Please do so.

A. If I could direct your attention to what amounts to the last page of this exhibit, there's a couple points I'd like to make.

One is that it says -- and I would actually like to read this sentence exactly, so I get the quote correctly.

"According to the National Park Service, TVA announced in 2001 that they will be installing sulfur dioxide controls, scrubbers, on the two power plants closest to the park by 2010, which will reduce sulfur dioxide emissions from those plants by over 90 percent and improve the park's air quality by lessening haze, particle pollution and acid rain."

Q. So based on your analysis, Mr. Chinkin, would the additional controls sought by North Carolina in this case on TVA power plants improve visibility in the Great Smoky Mountains National Park?

A. Yes, it would.

Q. Would it reduce acid deposition in the Great Smoky Mountains National Park?

A. Yes, it would.

Q. And would those additional controls sought by North Carolina reduce ozone pollution in the Great Smoky Mountains National Park?

A. Yes, it would.

Q. Do these excess emissions from TVA's power plants also impact national forests in the region?

A. Yes, they do.

Q. And what national forest resources are, in particular, affected by TVA's excess emissions, based on your analysis?

A. As I pointed out on Exhibit 156 earlier, the exhibit for PM, there are a number of national forests in the very high impact areas from the emissions from TVA's coal-fired power plants. Specifically, you know, we can talk about the national forests identified on these figures, Pisgah National Forest, you know, the Shining Rock Wilderness Areas, Nantahala National Forest. You know, there's many forests, many wilderness areas, state and federal, that are in these

very high impact areas.

Q. And as we heard the other day, is the Forest Service taking action to protect these resources, trying to take whatever actions it can, from this type of pollution?

MR. FINE: Your Honor, I think we've had a good deal of leading questions and I have to object to this one.

MR. GOODSTEIN: I can rephrase, Your Honor.

THE COURT: Yes.

MR. GOODSTEIN: Thank you, Your Honor.

BY MR. GOODSTEIN:

Q. Are you aware of the Forest Service's concerns about these type of air pollution impacts on the land that they manage?

A. Yes, I am, both from reading their reports and the testimony from a few days ago.

Q. And what about wilderness areas in this region? Are they being negatively impacted with the excess air pollution from TVA's coal-fired power plants?

MR. FINE: Your Honor, I'll object to the leading nature of the question and the argumentative nature of the question.

THE COURT: Don't lead the witness.

MR. GOODSTEIN: Thank you, Your Honor.

BY MR. GOODSTEIN:

Q. Your analysis, did you consider the impact on wilderness

areas?

A. Yes, we did.

Q. And what did that analysis show?

A. The analysis showed that the wilderness areas that were actually identified by Mr. Jackson a few days ago are some of the wilderness areas that are getting the most impact. The ones he's most concerned about are, in fact, the ones getting the most impact from the TVA power plant emissions, and we have some results that will show that.

Q. So let's look at Plaintiff's Exhibit 158, which is in evidence.

MR. GOODSTEIN: Before we do that, I'd like to offer a few exhibits into evidence, Your Honor. These official reports from the National Park Service, 176 and 174, we'd offer at this time.

THE COURT: All right. I have 176.

MR. GOODSTEIN: 174 should be the final one.

THE COURT: I have it. Yes, it's before me. And you move to introduce those?

MR. GOODSTEIN: Yes.

THE COURT: Let those be admitted.

(Plaintiff's Exhibits 174 and 176 received.)

MR. GOODSTEIN: And the plots from SAMI that we went over, Plaintiff's Exhibit 174, we'd offer those into evidence at this time as well, Your Honor.

THE COURT: All right. Let it be admitted.

BY MR. GOODSTEIN:

Q. Now, Mr. Chinkin, referring your attention to Plaintiff's Exhibit 178, are these figures showing the results of your modeling for sulfate deposition?

MR. FINE: Your Honor, I'm sorry. I believe Mr. Goodstein is referring to Plaintiff's Exhibit 158, not 178.

MR. GOODSTEIN: I'm sorry. Did I say 178? I meant 158.

Thank you, counsel.

THE WITNESS: That is correct.

THE COURT: Okay.

BY MR. GOODSTEIN:

Q. So now referring your attention to Plaintiff's Exhibit 158, Mr. Chinkin, can you show us how you concluded from your results that sulfate deposition is being contributed to by TVA's excess emissions from it's power plants?

A. Okay.

MR. FINE: Your Honor, again for the record, any testimony about sulfate deposition is objected to, and we are, of course, mindful of the Court's prior rulings.

MR. GOODSTEIN: Go ahead, Mr. Chinkin.

THE COURT: All right. Overruled. Go ahead.

THE WITNESS: Okay. What we have on the figure

here in front of us, similar to the ozone and PM figures I showed earlier, on the left is the model's prediction of the actual concentrations, in this case deposition. You can see the scale is sort of green in the cleanest areas, and it goes up to yellow, orange, all the way to purple. And these are kilograms per hector of deposition of sulfate. On the right is how much that will be improved by removing the excess emissions from the TVA coal-fired power plants.

And what I'd like to point out is that the areas that Mr. Jackson was concerned about, the national forest wilderness areas, are located along the high ridge mountains. That's where they are. And when you look at the figure on the left -- and I will circle it here -- you can see all the reds and purples there are along the high ridges of the Great Smoky Mountains, and when you look at the figure on the right, those are the areas in Tennessee and Kentucky and a little bit into western North Carolina that will achieve the greatest benefits from removing the TVA emissions.

So the areas that are most sensitive are the areas that will accrue the greatest benefits.

Q. Then you have a similar presentation of your results for nitrate deposition, which should be Plaintiff's Exhibit 159 in evidence.

A. That's correct.

Q. Can you explain to us what that shows?

A. To the unaided eye, this particular plot looks a lot like the last figure I just showed for sulfate deposition, but this is for nitrate deposition, which is the conversion of NOx into particles called nitrate particles.

Again, I will circle the areas here that are the reds and the purples, which are the highest deposition rates in the area. And, again, on the right, you can see the areas with the greatest improvements from removing of those emissions from the TVA coal-fired power plants would be accrued in those areas with the greatest deposition rates. So, like with sulfate, those areas most sensitive to nitrate would accrue the greatest benefits.

Q. And did you also consider the effects of TVA's excess pollutions from power plants on visibility?

A. Yes, we did.

Q. I'll refer you to Plaintiff's Exhibit 160, which is in evidence. And what do these -- how do these results factor into your conclusion that TVA's excess emissions from their power plants are having substantial impacts on air quality in the region?

A. Well, yesterday, Mr. Wheeler pointed out the specifics of the actual impact at a given Class 1 area. I'd like to step back a little bit and say the TVA coal-fired power plant fleet is impacting a wide area of Class 1 areas. Not just one or two, but all the Class 1 areas in this region are

being impacted by TVA's coal-fired power plants.

So while this table depicts the worst impact or the best improvement, flip side of the same coin, on a given day, the point to be made is that all of the entire area, the wilderness areas, the Great Smoky Mountains National Park, Grandfather Mountain, Clingman's Dome, going through the list, they will all experience improvements when TVA removes those excess emissions.

Q. And you're relying on Plaintiff's Exhibit 160, 161 and 162 that are in evidence?

A. That is correct.

Q. Now, you mentioned earlier, Mr. Chinkin, that you've had an opportunity to review TVA's expert reports, which commented on your reports.

A. Yes, that's correct.

Q. Did those comments on your analysis change your conclusions in any way?

A. Not in any way.

Q. Did you consider and evaluate the emissions inventories that were used by TVA's modelers?

A. Yes, we did.

Q. Did you find any discrepancies in that analysis?

A. Yes, we did.

Q. Did you prepare a figure which shows those discrepancies?

A. Yes, we did.

Q. I'd like to refer your attention to Plaintiff's Exhibit 183.

Is this a figure that you prepared, Mr. Chinkin?

A. Yes, it is.

Q. And can you tell us what it shows?

A. This is a figure that is showing the SO2 emissions that were obtained from a number of sources of information. There are a series of three bars for each of TVA's coal-fired power plants in this figure. Each bar represents the values that were to be used for the emissions from these coal-fired power plants in the modeling analysis of Tesche and Mueller, and what we found when we evaluated each of these pieces of information, that I'll talk about in just a minute, we found that there were discrepancies between all three.

So, for example, if we look at the very first set of three columns, you'll see the blue column is labeled "Scott." That was their emissions control technology planning person, as I understand it, on the TVA side. The red column is from Dr. Tesche's report, where he said what emissions he was modeling.

We had our staff scrutinize the emissions inventory input files that we received from Dr. Tesche, and we found the yellow column, the model emission inventory -- and what you would expect is that, like, at Bull Run, which I will

circle here, all three columns should be the same. What Mr. Scott said he used, what Dr. Tesche said he used should be what they used. But I remove the circle now and show that at Allen, for example, Dr. Tesche said that he used the reports of Mr. Scott's emissions inventory, but in fact didn't model those. He modeled substantially different numbers. In fact, his model emissions were approximately 18,000 or 15,000 tons wrong. It's not a small mistake.

And so if you look across this table, you'll see that there are discrepancies at a number of these facilities, what was reported to be used, what was used, what was supposed to be used is sometimes higher and sometimes lower.

So while, overall, I think Dr. Tesche's work corroborates our findings, these kind of discrepancies, as a scientist, cause me not to give his conclusions as much weight as I might otherwise if they didn't have these discrepancies in their work.

THE COURT: All right, gentlemen. I think we'll take our midmorning recess of 15 minutes.

MR. LANCASTER: Thank you, Your Honor.

THE COURT: Recess 15 minutes.

(Recess.)

MR. GOODSTEIN: Thank you, Your Honor.

BY MR. GOODSTEIN:

Q. All right, Mr. Chinkin, we were on Plaintiff's Exhibit

183 and you were describing the discrepancies that you found in the emissions inventories and documentation of those emissions that Dr. Tesche and Mr. Mueller used.

A. That's correct.

Q. Can you summarize what your conclusions were, having identified these discrepancies?

A. Yes. On the Exhibit 183, I pointed out that there were a number of discrepancies. I will circle them.

Q. And this is on the sulfur dioxide emissions?

A. That's correct.

Q. And did you find similar discrepancies on the nitrogen oxide emissions?

A. Yes, I did.

Q. And are those shown in Plaintiff's Exhibit 182?

A. Yes, they are.

Q. And can you identify those for us?

What was the significance for you in your consideration of Dr. Tesche and Mr. Mueller's comments and their conclusions of these discrepancies?

A. The important thing here isn't so much the magnitude of these discrepancies. I think what concerned me the most was the number and the type of discrepancies that we saw. When you are trying your best to tell somebody the impacts of controlling a source, you spend your most effort making sure you get that right. The emissions from that source are where

your greatest focus should be, and when there were errors in those sources that they were most focused on, it gives me pause about their conclusions they reached, despite not paying attention, frankly, to the most important things they should have been paying attention to.

Q. What about the display techniques that Dr. Tesche and Mr. Mueller used in their report? How did that factor in when you were evaluating their conclusions?

A. Well, that actually had sort of a twofold effect on my review of their work.

Number one, it made it difficult to interpret it, but properly interpreted, their results actually corroborated our findings.

But, secondly, I find their work, frankly, to be very mischaracterizing in result, very misleading, and I prepared some displays to show what I mean by that.

Q. All right. So I'll refer your attention to Plaintiff's Exhibit 192. Can you identify that for us?

A. Yes. This is a figure and figure caption from the Tesche and Mueller report, expert report that we received. This particular figure is from their executive summary, and it is showing their estimate of ozone impacts from -- well, it's kind of complicated. Let me slow down and explain this.

They were trying to show the difference between the benefits that we were showing from reducing TVA's coal-fired

power plant emissions using the Clean Smokestacks Act equivalent and what they say TVA's Clean Air Plan would achieve.

So this isn't the full benefits of the Clean Smokestacks Act applied to TVA. It's the difference between what they say will happen in 2013 and what Dr. Staudt said 2013 would look like. And what you see on this plot is that difference. And what I wanted to point out is that it looks like the only real impacts are sort of -- mostly in Tennessee, a little bit in Kentucky and a little bit in Alabama and Georgia because of how they displayed it.

If you look at the scale on the left, you'll notice that the colors stop at 2 parts per billion, or ppb, and that gray area looks like it encompasses much of the eastern United States. And as we have shown in our modeling -- and I've got another plot that we can show in a minute that will redisplay the same data using scales that go lower than 2 parts per billion that will show a dramatically different view of the same information. That's why I believe that it's sort of misleading or mischaracterizing to display it this way.

Furthermore, in the figure caption, they use words that I would hope we could all agree are misleading or mischaracterizing the results, and I'll point those out.

If you look at the third row of the figure caption, near the end of that row, after the comma, it says -- well,

actually, let's go to the beginning of the sentence in parentheses, so we have a complete sentence for the record.

"Across the seven-month summertime episode, the CSS" -- that's what they're referring to as the Clean Smokestacks Act -- "scenario yields slight ozone benefits" -- and then in brackets -- "10 to 16 parts per billion in Eastern Tennessee and Northern Alabama."

Well, I would say that, as a scientist in this field for almost 30 years now, 10 to 16 parts per billion, half of the difference between natural background and the Ambient Air Quality Standard of 75 cannot be described as slight. That is a huge benefit, and to use words like that, I, frankly, find surprising.

I know Dr. Tesche. I've worked with him. I worked at the same firm with him. I'm shocked that he used those words.

Q. Would you describe these benefits as slight?

A. No, I would not.

Q. How would you describe them?

A. I would describe these as huge, frankly. I have many, many projects and clients I have worked for who were pleased to see 1 or 2 parts per billion control measures. 10 to 16 is a huge benefit.

Q. And did you prepare a plot that shows this data properly displayed?

A. Yes, I did.
Q. Like to show you Plaintiff's Exhibit 193. And can you explain to us what this shows?
A. This is a figure that is basically taking the same exact data from Dr. Tesche's reports and redisplaying them on a scale that goes lower than 2 parts per billion; so you can actually see all the data in that gray area that was on that plot. And as you can see, similar to that plot, there was major impacts in Tennessee, Northern Alabama, just as their plot showed, but what you can also see is that there are impacts that extend throughout the entire domain, all the way to the ocean, all the way to the Gulf of Mexico.

You can see from their own work, there are impacts throughout North Carolina. You can see the scale and you can see that those impacts are in the range of sort of light blue, light green and yellow. So they're in the order of 1 to 2 to 4 to 6 parts per billion. And as I said earlier, those are substantial impacts and, therefore, substantial benefits would be accrued by reducing ozone by that amount.

MR. GOODSTEIN: Your Honor, we offer Plaintiff's Exhibit 193 into evidence.

THE COURT: Let it be admitted.

(Plaintiff's Exhibit No. 193 received.)

BY MR. GOODSTEIN:

Q. Do you have another summary from Dr. Tesche and

Mr. Mueller's report that you can show us which, when properly interpreted, support your conclusions, Mr. Chinkin?

A. Yes, I do.

Q. I'd like to show you Exhibit 191 for identification. And there are a lot of numbers on this page, so maybe you can focus us in on the screen to the particular ones that you want to discuss.

A. Okay. Well, let me first say that, overall, this set of tables comes from Dr. Tesche and Mueller's supplemental report. And what I'd like to do is, I will walk through each sub-table one by one so you don't have to look at all the details here, and we'll blow them up on the screen and look at the individual cells that I'd like to talk about.

And what's important is to remember what this is. This is the result of TVA's modelers predictions. This is their modeling results. It's not STI's; it's not EPA's; it's not SAMI's. This is TVA's own modeling results. And what these tables are showing are what their estimate is for impacts in 2013 from TVA sources, and it will be on ozone, PM, visibility. We'll go through each one.

I need to remind everybody that their estimates of impacts assume controls on facilities that are not yet controlled. So these estimated impacts need to be multiplied by about two to compare with our estimate of impacts using the Clean Smokestacks Act's equivalent rates. So while I'm

going to show their numbers and their numbers are significant even by themself, these numbers should be multiplied by about two to be equivalent and comparable to ours. And I say that because that's why I found their work corroborative to ours, when you multiply it by a factor of two.

So let's go through each table.

So the first table is ozone. And what I'd like to highlight is in the left-hand column, where it says "Ozone Metric," and you see it says, "Maximum 8-hour source impact in ppb's," or parts per billion. And then you move over to the right-hand side and it says, TVA's sources -- that's the coal-fired power plants -- impact, or "contributions" is the word they use, in North Carolina. And they estimate the impact to be 7.4 parts per billion. Multiply that by two, approximately, and you're getting about 14 or 15 parts per billion impact. TVA says at least, even assuming their assumptions in 2013, it's 7.4. 7.4, by itself, is a substantial impact. That's not an acceptable level. It's not a zero impact. We think it's more like 14 or 15 parts per billion.

MR. GOODSTEIN: Your Honor, this is highlighted on the screen, if it would be easier to follow us, since it's a complicated table.

THE COURT: All right.

BY MR. GOODSTEIN:

Q. Please continue, Mr. Chinkin.

A. What I'd like to do now is move on to table 1B and similarly look at the impacts in North Carolina that TVA has estimated.

This table is looking at the metric PM2.5. PM2.5 has two methods of concern. There's a daily average concern and an annual average concern. So we have two rows that we have to look at in this table.

Again, the first row is the daily maximum 24-hour impact. And if we go to the right, TVA's estimate of their own impact in 2013 is 2.6 micrograms per cubic meter. We believe that number should be multiplied by two. We believe it should be closer to 5 micrograms per cubic meter.

If you go to the second row, it says the "Maximum Annual Source Impacts." They estimate 0.2 micrograms. If you double that, you get approximately .4 micrograms, which is what we estimated the impacts were.

So again TVA's own modeling is completely corroborative of our modeling when properly interpreted. And even the levels they show, the .2-micrograms, is not acceptable, because if you are at 15.2, that .2 micrograms would bring you into attainment of the Ambient Air Quality Standards.

The next table, table 1C, is TVA's estimates of their impacts on visibility. So, likewise, the left-hand column,

they've actually shown the visibility impact at a number of Class 1 sites. In the far right-hand column, they give you what are the percentage improvements that you would expect if you were to remove the emissions. And you can see by their own estimate those improvements are quite substantial: 27 percent at Great Smoky Mountains; 29 percent at Slickrock; 17 percent at Shining Rock; 29 percent at Linville Gorge. And you can see all the way to Swan Quarter on the coastline is 6 percent in eastern North Carolina.

And, again, by our estimate, these numbers should be doubled. But even by their own estimates, these are substantial impacts that are still remaining if they don't remove their emissions, and we think these impacts are half of what the true impacts are.

And the one last table, table 1D, is TVA's expert modelers estimate of their impacts on deposition. So there's two rows. The first row is the annual sulfate and the second row is annual nitrate deposition in kilograms per hector. And if you go to the far right, you'll see they estimate their sulfate contributions at 2.0 kilograms per hector. Again, we think that should be doubled, to about 4 kilograms per hector. And their estimate of nitrate deposition is smaller, at .3 kilograms per hector, and we think that should be double.

I need to add one comment that I've sort of overlooked

through all my testimony today, and that is, when we were doing these comparison plots for ozone, and now for deposition, we've been giving TVA credit -- "we" meaning Dr. Staudt's estimates assumed annual operation of their SCRs. If those are not operated annually, all of the things that are related to NOx that I presented, the ozone impacts, would be greater; therefore, the benefits that would be accrued would be greater. The deposition, nitrate deposition impacts would be greater, and the benefits would be greater as well.

Q. So, Mr. Chinkin, in conclusion, what are your -- what does this analysis show you about the impacts of TVA's excess emissions, their current impacts on air quality in North Carolina and the region?

A. The totality of all the information I've presented, the work of the TVA modelers, our modeling at STI, SAMI, EPA's CAIR modeling, the National Park Service's own reports, all say the same thing: The impacts from TVA's power plants are large and they would accrue great benefits if these emissions were reduced.

Q. And overall, what is your conclusion about the benefits to air quality that would result from the additional controls on these plants sought by North Carolina?

A. The benefits for both NOx and SO2 controls that we're talking about in this case would be huge. I think the best

way to say it is, removing these NOx and SO2 emissions from TVA's power plants is equivalent to removing 3.7 million heavy-duty diesel trucks off the road. It's equivalent to removing 12.8 million passenger vehicles off the road every day.

MR. GOODSTEIN: If I could have a moment, Your Honor, to consult with counsel.

(A discussion was held off the record by plaintiff's counsel.)

MR. GOODSTEIN: Your Honor, we offer Exhibits 182 and 183 for identification into evidence. And I have one more question of Mr. Chinkin.

BY MR. GOODSTEIN:

Q. In your supplemental report, Mr. Chinkin, you had the conclusion that each of the power plants in the TVA system are impacting air quality in North Carolina and the region. Can you please summarize the basis for that conclusion and how you arrived at that conclusion?

A. Okay. As I've demonstrated with example figures today, we examined the daily impact plots for the entire year that we modeled, and you can see on daily impact plots individual power plant impacts in North Carolina, Tennessee, Kentucky, Alabama and throughout the region. So when you average that up over the course of a year, like for the annual average PM, it's hard to see those individual plumes, but our analysis

showed that every individual power plant contributed to impacts in North Carolina and throughout the region.

Q. Each power plant in the TVA system?

A. That is correct, each individual power plant.

MR. GOODSTEIN: We have no further questions of this witness at this time, Your Honor.

THE COURT: All right. Mr. Fine?

MR. FINE: Thank you, Your Honor.

THE COURT: You may proceed.

CROSS EXAMINATION

BY MR. FINE:

Q. Mr. Chinkin, I'll try and move this along as quickly as I can so the corporate tie can go back into storage.

A few details to clean up first before we get to some more substantive points.

If you would do me the kindness, sir, in using the book that your counsel has so efficiently provided to us all. Plaintiff's Exhibit 176. I believe that's the report from the National Park Service.

A. I have it.

Q. And, sir, I believe I'm correct in stating this. On the second page into this exhibit, this report reflects that it was issued in September of 2002?

A. That's correct.

Q. That's about, certainly more than, what, five and a half

years ago?
A. Give or take, yes.
Q. All right, sir.
And turning, if you would, please, to Plaintiff's Exhibit 174, which I think is the Great Smoky Mountains National Park Management Folio No. 2, I think there's a small legend at the top of the document --
A. That's correct.
Q. -- on air quality.
And just so that it's clear on the record, as I read the revision date on this, this was revised in March of 2006.
A. That's what mine says.
Q. All right, sir. Just bear with me. I apologize for doing this, but if you could turn back to Plaintiff's 176 very briefly, and if I could ask you to direct your attention to page 36 .
A. Okay.
Q. And if I could direct your attention to the -- toward the bottom of the last column of the print section of this page, the sentence that begins with "primarily." You see that?
A. Yes, I do.
Q. And I'm correct in stating that the Park Service reports it as primarily the burning of high sulfur coal in eastern power plants and industrial facilities that produces sulfur

dioxide emissions that are transformed in the atmosphere into fine, airborne sulfate particles. Is that correct?
A. That's what it says.
Q. With a reference to high sulfur coal.
A. That is the word they use.
Q. And turning just once again briefly to Plaintiff's Exhibit 174. In your direct testimony, you were already kind enough to read one of these sections about TVA into the record. If I could direct your attention to the preceding page, what I think that one of my colleagues have called the penultimate page and what I'll call the next to the last.
A. Okay.
Q. And if I could direct your attention to the column on the right that says, "Finding Solutions."
A. I see that.
Q. And I think there is a bullet point that begins, "Environmental Protection Agency, EPA Programs Took Effect." Do you see that?
A. Yes, I do.
Q. And it goes on to read: "took effect in 2004, that reduced nitrogen oxides in most eastern states by 30 percent. The Tennessee Valley Authority, TVA, installed nitrogen oxide emission controls on the two power plants closest to the park, which reduced emissions by 71 percent. This has led to less ozone pollution and nitrogen deposition in the park."

You see that, sir?
A. Yes, I do.
Q. And this, again, is a document that you relied on to help form your expert opinion?
A. That's correct. Reducing the NOx reduces ozone. That's a good thing.
Q. I apologize for jumping around some in the book, but if you'd indulge me, sir, by just turning very briefly to Plaintiff's Exhibit No. 11.
A. Okay.
Q. And this is -- if I understand it, this is an extract from the technical support document for the final Clean Air Interstate Rule that has been previously introduced into evidence?
A. That's correct.
Q. Sir, I'm correct, am I not, that the modeling that's reflected in this technical support document was 2001 modeling?
A. There has been a series of questions that are confusing to, I think, the attorneys who don't do this kind of work about what a data report is versus the modeling that report reflects. These results reflect estimated impacts in 2010, regardless of the date that says March 2005 on the cover sheet or the base year from which the 2010 emissions were forecasted from, 2000.

Q. Let me be a little clearer in my question, Mr. Chinkin, and maybe we'll get to where we need to go.

The base year that was used for the 2010 projections was 2001?

A. I don't know that precisely, but that is probably correct.

Q. All right, sir. And I appreciate your indulgence in getting me on the right track.

Now, you have presented several exhibits and testified about several exhibits that I actually think that maybe Mr. Wheeler may have put into evidence yesterday. Before we get into looking at those, let me just draw your attention, if I can, to some of your comments concerning Dr. Tesche and Mr. Mueller's report. And I'd ask you, first of all, if you could turn to Plaintiff's Exhibit 183.

A. Okay.

Q. Before I ask some specific questions concerning this report, I believe you will agree with me that the modeling done by both sides in this case produced, in my words anyway, a torrent of information?

A. Yes, I would agree to that.

Q. I believe you, yourself, testified that if you printed out all of your analysis, all of your tile plots for your daily runs that you'd have a report that would be at least 10,000 pages long?

A. I believe those are my words, yeah.
Q. And I would think that based on your review of the TVA modeling in this case, that TVA produced data at least as voluminous as what STI produced.
A. I would assume so.
Q. All right, sir. So what we're talking about has been, again, in my words, a torrent of information presented for folks to try and analyze; is that correct?
A. That's correct.
Q. And in some instances -- well, actually, in all instances, under some time constraints, correct?
A. That's very much true.
Q. And I think we've already alluded to some of the time constraints you and Mr. Wheeler were under in producing the June 2007 second supplemental report.
A. That's correct.
Q. Taking your attention back to Plaintiff's Exhibit 183, you, of course, have reviewed Dr. Tesche and Mr. Mueller's supplemental report, have you not?
A. Yes, I have.
Q. And would it not be correct -- I think I am correct in stating that regarding the discrepancies that you have identified for Colbert, Gallatin, Johnsonville and Widows Creek, that Dr. Tesche and Mr. Mueller's supplemental report indicated that there was an error in reporting those numbers

and not in the numbers that were used by Dr. Tesche and Mr. Mueller in the actual model.

A. I believe that's correct.

Q. And, in fact, the supplemental report included a corrected figure showing the actual numbers that were used in the modeling.

A. I believe that's true.

Q. And that would be the same story for Plaintiff's Exhibit 182 on NOx emissions, correct?

A. That is correct.

Q. All right. So putting what I'm going to call the reporting error that's reflected in Plaintiff's Exhibit 183 and 182 to one side, let's talk a few moments, if we can, about the errors that are -- or the omissions that are indicated for the Allen plant and the Shawnee plant. And we can start with the sulfur dioxide emissions on Plaintiff's Exhibit 183 to begin with, if you wouldn't mind, sir.

A. That's fine.

Q. Sir, you would agree with me that what we're looking at is that two of the three units at Allen and one of the ten units at Shawnee, that emissions from those three units were omitted from the inventory used by Dr. Tesche and Mr. Mueller in their initial report.

A. I believe that's correct.

Q. And that the unit that was omitted at Shawnee is unit

10, which is the atmospheric fluidized bed combustion unit; is that correct?

A. I don't know that personally, but that could be the right description.

Q. An AFBC unit would be -- because of the nature of its technology, would be a low emitter of, in this instance, sulfur dioxide.

A. That is consistent with this being a small discrepancy.

Q. All right, sir. And just so that we don't -- well, we'll get into that in a moment.

But again, in looking at the sulfur dioxide emission error for Shawnee and Allen, you would agree with me, would you not, that, again, the impact of this emission was covered by Dr. Tesche and Mr. Mueller in their supplemental report?

A. They made an approximation to estimate how much different the grams would be, that's correct.

Q. And approximately, the estimation they came up with was, in terms an impact of PM2.5 over North Carolina, was 0.01 micrograms per cubic meter of PM2.5?

A. I believe that was what their estimate was.

Q. All right, sir.

And turning very briefly to Plaintiff's Exhibit 182, which is the NOx emissions on the bar chart that you have introduced into evidence here today, again, we're looking at the -- in terms of the Shawnee and the Allen emissions, we're

looking at one unit at Shawnee and two units at Allen, correct?

A. That's my understanding.

Q. And again, the unit at Shawnee, if, in fact, as I say, is the AFBC unit, that, by the nature of its technology, is a low NOx emitter.

A. I'll agree with you, if that's the case.

Q. Okay. Just accept for the moment that I'm correct on that and we'll shore that up later. If you'll just follow me along on that, I'd appreciate it.

A. Okay.

Q. And again, Dr. Tesche and Mr. Mueller, in their supplemental report, dealt with the impact of the omission of these three units, correct?

A. Right. They made an estimate of the discrepancies of what the impact would be.

Q. In terms of ozone. And that their estimate was that adding back in the omitted units would contribute no more than 1.2 parts per billion to maximum 8-hour ozone in North Carolina and 1.5 parts per billion to maximum 1-hour ozone in North Carolina, and the high end of the estimate.

A. That's what I recall.

Q. And just so that it's clear, I believe -- I think that the map that I believe is Plaintiff's Exhibit 58 -- and I apologize if I have the number wrong. But anyway, the map

that North Carolina has produced of the TVA service area with the TVA plants that shows the -- anyway, whatever the number is, and I'm sure we can get that corrected. It's the map that's in front of you there in the jury box with the TVA plant locations located on an outline of the TVA service area. You see that, do you not?

A. Yes, I do.

Q. And I believe, sir, that based on your prior testimony, you know that the Allen fossil plant, as indicated on that map, is located near Memphis, Tennessee?

A. That's correct.

Q. About the farthest west you can go in the TVA service area.

A. That's correct.

Q. And the Shawnee plant is located in southwestern Kentucky, correct?

A. That's correct.

Q. And those two plants are probably about -- in fact, are the furthest away from North Carolina than any of TVA's plants?

A. That's correct.

MR. FINE: A moment, please, Your Honor.

(Pause.)

THE COURT: All right.

BY MR. FINE:

Q. Let me draw your attention briefly to a document that's been marked, I believe, for identification. I don't think it was offered into evidence. Plaintiff's Exhibit 191. Those were the charts or the tables -- the tables, I should say, that you were looking at from Dr. Tesche and Mr. Mueller's supplemental report.

A. Okay. I have that.

Q. And just, first of all, so that we're clear, you noted that, particularly, with some of these numbers -- I'm going to focus primarily on the PM2.5 number initially and perhaps also the visibility impacts and the acid deposition impacts -- that you were saying that, in your estimation, the numbers reported by Dr. Tesche and Mr. Mueller in all likelihood should be doubled?

A. I want to make sure that the characterization is correct.

Q. By all means, sir.

A. The reason they should be doubled is because there's a difference in what they modeled versus the CSA equivalent. That's why they should be doubled.

Q. And one of the things that they modeled were additional scrubbers at the Bull Run plant and the Kingston plant, correct?

A. That's my understanding.

Q. And you understand, I believe, from the testimony you've heard so far in the trial that the Bull Run scrubber will, in fact, go into operation later this year and that the two scrubbers at Kingston are some at least 50 percent completed, correct?

A. That's my understanding.

Q. All right, sir. Before we move away from Plaintiff's Exhibit 191, you will agree with me, would you not, that some of the other numbers that are being recorded here by Dr. Tesche and Mr. Mueller report the contributions from North Carolina's power plants with the controls from the Clean Smokestacks Act?

A. That is what they are purported to do. I did not analyze for North Carolina power plant impacts, specifically, so I can't comment on those.

Q. So you didn't analyze North Carolina's power plant impacts as far as your modeling or your analysis?

A. Not separately. All their emissions were included in the modeling, but we did not identify them separately as they have done in this table.

Q. Well, just so that we're clear, I guess, in terms of your frame of reference, if nothing else, I believe you testified, for instance, with the ozone impacts, that you thought that even taking TVA's number of 7.4 parts per billion was a substantial impact. That's correct, is it not?

A. That's a correct statement.
Q. Well, then the 14.2 parts per billion impact from the North Carolina power plants would be even more substantial?
A. That's just math. I would agree.
Q. And the same for the other three tables that are reflected in Plaintiff's Exhibit 191. I believe your testimony was the TVA contribution was substantial, and, if that's the case, the numbers indicated for North Carolina's power plant impacts would be even more substantial.
A. If those numbers represent North Carolina's power plants. I can't attest to that.
Q. All right, sir.
A. And if I might add, even if that is true, that those are North Carolina's power plant impacts, that doesn't lessen the gravity of TVA's impacts in North Carolina.
Q. Thank you for that observation, Mr. Chinkin.
Mr. Chinkin, I'd like to ask you to please direct your attention to Plaintiff's Exhibit 149.
A. Okay.
Q. If I have the correct document in front of me, this is one of your blowups of the modeling results that you obtained for annual PM2.5 concentrations?
A. That's correct.
Q. All right, sir. And just so that it's clear in the record, what you're showing here is a zero out for the entire

TVA system; is that correct?
A. That is not correct.
Q. It is not correct?
A. This is an implementation of the Clean Smokestacks Act equivalent rates in that future 2013 modeling case. It's not a complete zero out.
Q. But this does reflect your modeling for all of -- the entire TVA fleet?
A. Oh, that is correct.
Q. I apologize, Mr. Chinkin. I was leading myself down the primrose path, and I appreciate your redirecting my feet.

But this does not reflect modeling of the impacts from any particular individual TVA plant?
A. Each plant was -- emissions were adjusted and they were all run at the same time so you see the impacts of all of them together, but each plant was treated separately.
Q. But the modeling result that you're presenting here reflects the entire TVA fleet.
A. That is correct.
Q. It does not reflect a particular impact from a particular plant, the modeling result you're presenting here?
A. It represents the combined impact of all of the plants.

MR. FINE: A moment, if you please, Your Honor.

THE COURT: All right.

MR. FINE: Mr. Chinkin, thank you for your

patience. I have no further questions.

MR. GOODSTEIN: No redirect, Your Honor.

THE COURT: All right. Thank you very much. That will complete your testimony, and you are excused.

(Witness stepped down.)

MR. GOODSTEIN: If we could have a moment, Your Honor, to change seats. Mr. Gulick is going to present the next witness.

THE COURT: All right.

MR. GULICK: Your Honor, we call Mr. Will Harlan to the stand.

THE COURT: All right, sir.

WILLIAM STEVEN HARLAN, JR.

being duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. GULICK:

Q. Mr. Harlan, would you please state your name for the record?

A. William Steven Harlan, Jr.

Q. Where do you live, Mr. Harlan?

A. I live in Barnardsville, North Carolina, just outside of Asheville.

Q. Are you married?

A. I am.

Q. What is your wife's name?

A. Emily Diznoff.
Q. Is she here in the courtroom?
A. She is.
Q. What is your educational background?
A. I have my master's degree in English from Emory University.
Q. Where do you work?
A. I'm the executive editor of "Blue Ridge Outdoors Magazine" based here in Asheville, North Carolina, and also in Charlottesville, Virginia.
Q. What is "Blue Ridge Outdoors Magazine"?
A. It's a magazine that reaches readers from Georgia to Maryland, about a quarter million in distribution, and it's a magazine that talks about hiking and recreational opportunities in the Southeast.
Q. How long have you worked at "Blue Ridge Outdoors Magazine"?
A. Seven years.
Q. What is your responsibility there?
A. My job is to coordinate all of the editorial materials, from photography to stories. I edit every story that appears in the magazine, write some of the stories; and am responsible for all of the editorial content.
Q. How long have you lived in Asheville?
A. About seven years, also.

Q. Where did you move to Asheville from?

A. Moved to Asheville from Atlanta, Georgia.

Q. What were you doing in Atlanta before you came here?

A. Before I came to Asheville, I was a high school English teacher and a college English teacher and was also a writer for "Creative Loafing Magazine." It's the second largest magazine in Atlanta, reaches about a half a million readers in Atlanta.

Q. Now, what is your wife's profession?

A. My wife is a family practice physician.

Q. Why did you move to Asheville?

A. There were a couple of reasons. One, my wife was looking for a residency program. She went to school at Emory University. She did her medical -- she did her medical school at Emory, and that's where we met, and we were looking for places for her to do her residency.

We looked all over the country, and she really wanted my input, and I wanted to go somewhere where I could run. I was a competitive runner in Atlanta, won dozens of races, and wanted to be in a place where I could train and run really well, and the mountains of western North Carolina seemed like an ideal place. Especially because Atlanta is so polluted with air, the air pollution is so bad down there, I thought getting away to the, supposedly, clean mountains of western North Carolina would be a relief. And it turned out not to

be the case. When we got here, we learned that, in fact, the pollution here in the mountains is worse than Atlanta on many summer days.

Q. How long have you been a competitive runner?

A. Been a competitive runner since high school, but, especially in the past 12 to 15 years, I've been a competitive distance runner, running everything from marathons to 100-mile races, and I'm quite -- I was quite competitive regionally, and even nationally.

Q. What type of race -- you indicated the types of races. Are there races around here that you've competed in?

A. Yeah. I'm the five-time champion and course record holder of the Mount Mitchell 40-mile challenge, which is a race that starts in Black Mountain, North Carolina, and runs to the top of the tallest mountain east of the Rockies, Mount Mitchell, and then back down again. I won that five years out of the past six, and also won at least a dozen other ultra-marathons.

Q. So you consider -- are you in good condition for running?

A. I think so.

Q. I'd like to draw your attention to the date of July 19, 2003 and ask if on July 19 you scheduled a run for yourself.

A. I had. On that weekend, I was planning to run across the Great Smoky Mountains National Park along the Appalachian

Trail the distance of 72 miles, from the east side of the park to the west side of the park.

Q. How long did you anticipate, based on your experience, it would take you to run that distance?

A. I anticipated between 12 and 14 hours, perhaps longer with some rest stops. But based on my current training and my performance in previous training runs and races, I thought that was a realistic expectation.

Q. I'd like to show you -- it will appearing on your screen, Mr. Harlan -- Plaintiff's Exhibit marked for identification as 221 and ask you if you can identify what this document is.

A. Yeah. This is my training log that I've kept since high school. This particular one is from January to July of 2003.

Q. And what's written there, is that -- whose handwriting is that?

A. That's my handwriting.

Q. I'd like to go to the next page of this document and -- Could you blow that up a little bit, Gary?

I just want to look at a couple of the dates so you can tell us, Mr. Harlan -- if you can point to a particular date and just tell us what the notations there mean.

A. Yeah. My training log isn't very fancy. A lot of folks have really nice training logs, but this is just a basic calendar I just print off and just record the amount of

mileage and any other workouts I do on a particular day.

And so the numbers on each day represent the amount of mileage I've run that day, or if there's other cross-training activities, like I played soccer on a weekly basis, if I biked into work or did a bike workout, that would be reflected; and then the PS stands for pushups and situps and core strengthening, which is something I do on an every-other-day basis, which is really important to actually to help my running, as well as just to stay fit on an overall level.

Q. Thank you.

You told us what the route was for your run. Did you sort of have a name for this run?

A. Yeah. It was the Great Smokies End-to-End Run, and I was running for -- ironically, running for clean air. I was looking to try to -- trying to help a local grassroots environmental organization called the Canary Coalition, and I thought what better way than to run across the most polluted park in the country to kind of highlight the woes that this park and this region face.

Q. I want to show you what has been marked as Plaintiff's Exhibit 222 and ask if you recognize that document.

A. This is my very rough sketch map that I carried with me during the run that basically marks all of the various springs and water sources along the trail, and also indicated

where I'd be meeting my wife and various others along the trail, and then, based on other maps, the approximate mileage at trail junctions and shelters so I'd have an idea where I was along the trail.

Q. It's very faint, but you probably -- did you create this document yourself?

A. I did, and I based it off of topographic maps and guides to the Great Smoky Mountains National Park.

Q. So this is the map you actually used on your run?

A. This is the map I actually used during the run.

Q. And I was wondering if you could draw your -- could you show us on the map where you started and what -- and tell us what that is.

A. I started on the east side of Great Smoky Mountains National Park at Davenport Gap, which is just a mile or two from Interstate 40. So my wife, Emily Diznoff, drove me that morning to the trailhead, the Appalachian trailhead there at Davenport Gap, at 6:00 a.m. It was dark when I started, and that's where the run began. And, again, it was along the Appalachian Trail, right at the edge of Great Smoky Mountains National Park.

Q. How were you planning to handle food and water and resupply yourself?

A. I carried a small fanny pack that was loaded with energy bars and gels, as well as bottles of water and electrolyte

fluids and tablets. So I was well supplied myself, but we also scheduled meeting places along the Appalachian Trail where my wife would have paved road access where she could meet me, or, in one case, where she would have had to hike in from a paved road about five miles to meet me.

Q. When you planned this run, was there any question in your mind about your ability to complete it?

A. No. I had run hundred-mile races, longer distances than this, and running them at a competitive level. This was more of a recreational fun run, so I had no doubts about my physical ability to finish.

Q. If you would, could you describe for us the course of your run until your first stop?

A. Sure. So from Davenport Gap, the trail climbs for about six miles, it's a gentle but steady climb, and continues to climb up to Mount Cammerer, basically, and then up to Mount Guyot.

Q. Will you point out where that is on this map?

A. Basically up to -- there's Guyot. And that stretch is mostly uphill. There's a few saddles and gaps and some waters -- some springs along the way. But I was taking my time. It was early in the morning, and I was just enjoying the experience. There was some cloud cover. The sun hadn't burned the morning mist or fog off, so it was still relatively overcast at that point, and I was feeling great

and moving along the trail.

The only thing that was slowing me down was the trail was a bit overgrown. Blackberry brambles and just grasses along the trail had kind of slowed my progress, making it hard to actually see the trail in a few places. Other than that, it was a great morning.

Q. Now, along this portion, or at some portion of the run, did you run along with anyone else for a while?

A. Yes. Well, this portion, I was completely on my own, and then, as I descended Mount Guyot and Mount Cammerer, and going towards Newfound Gap, which is at mile marker 31, which is roughly the halfway point here, Newfound Gap, about eight miles from there, a running friend of mine, Anne Riddle Lundblad ran in from Newfound Gap and met me at approximately mile marker -- or approximately mile 22-ish, and ran with me back out to Newfound Gap. So that was nice to have a companion, after running by myself for 20 something miles through the wilderness of the Great Smoky Mountains National Park.

Q. And do you recall, about what time did you arrive at Newfound Gap?

A. I arrived at about 1 o'clock. It was definitely getting warmer at that point. The sun was shining full, and I was definitely feeling the heat at that point, and so it was a welcome -- a welcome arrival at Newfound Gap. That's where

my wife was, that's where the executive director of the Canary Coalition had set up a table, and there were lots of folks milling around, supporting the run and offering me encouragement, and just a festive, supportive atmosphere there and a good place to recharge.

Q. About how far along had you run by that time?

A. That's about 31 and a half miles from Davenport Gap.

Q. And how long did you stay at Newfound Gap?

A. About 20 to 30 minutes. I used the restroom, I ate some solid foods, talked with various folks, and met a couple of other runners who were going to join me for the next eight-and-a-half mile section up to Clingman's Dome, which I've marked there, which is the highest point along the Appalachian Trail, at 6,640 feet. And I knew this next eight-and-a-half-mile stretch was going to be a tough one. It was the hottest part of the day and highest elevation and I'd just run 31 miles, so I knew this was going to be a more difficult stretch.

Q. About how far was it from Newfound Gap to the top of Clingman's Dome?

A. About eight and a half miles.

Q. Describe for us, if you would, the events that occurred from Newfound Gap along your run up to Clingman's Dome.

A. I started out not feeling so great. I started feeling light-headed and I felt some tightness in my chest and I was

unable to inhale deeply. I was unable to get a deep inhalation. And I didn't really know exactly what was going on, but I figured maybe it was the altitude. I really didn't know, and so I just chocked it up to altitude and the heat and continued pushing up to Clingman's Dome. But something was definitely not right with my breathing, but at the time I didn't know exactly what was going on, other than it definitely didn't feel right and I couldn't get a deep inhalation.

Q. About what time did you arrive at Clingman's Dome, at the top?

A. Around 3 o'clock. Between 3 o'clock and 3:30. And my wife was there to meet me at the top of Clingman's Dome, as well, to resupply and rehydrate.

Q. And how were you feeling at that time?

A. I was feeling horrible, actually. But I was, again, hoping that it would dissipate. This was the highest point along the Appalachian Trail. It was incredibly hot out. And I thought those factors were, perhaps, contributing to it, and that the next five miles or so were downhill and that maybe it would resolve itself as I dropped in elevation and had, you know, a downhill to recover on. And so I decided to push on from there. And I'd also resupplied at the top of Clingman's Dome with my wife, so I felt pretty good.

Q. How long were you there?

A. I was there a little longer than anticipated because I felt like something was wrong, and my wife encouraged me to take my time and make sure I was feeling okay before I pressed on because it was another 18 miles or so before I'd see her again. But I was not feeling good, and so I took a good 20 to 30 minutes up there to try to refuel and recharge.

Q. The difficulty breathing that you described, had you experienced that before?

A. I had never experienced it before, and that's what was so concerning but also so puzzling, and so I didn't know what to make of it, and that's why I thought it would resolve itself, because I had never before experienced it. I'm a runner in perfect health who never had any kind of respiratory problems, never been diagnosed with any kind of respiratory ailments, so I assumed it was just something acute that would go away.

Q. What was your next, sort of, meeting place?

A. So our next meeting place was --

Q. Or planned meeting place.

A. Planned meeting place was Russell Field, which is at about mile 58, roughly, on the trail, about 18 miles between Clingman's Dome and that meeting place. And my wife would be driving around on paved roads through Cades Cove and then hiking in about five miles along a trail to meet me at that shelter at Russell Field. And I'd be running, obviously,

along the Appalachian Trail and meeting her there.

Q. Would you describe the course of events that occurred along the next portion of the trail when you were running toward -- in the direction of Russell Field on the trail?

A. Sure. So things did not resolve themselves; they only got worse. Even though it was five easy miles of downhill, my breathing was getting more and more labored. I just simply could not get a deep breath in, and so I was having to stop more frequently and walk to slow my breathing down because I wasn't getting enough oxygen. And so I stopped at a few shelters in between Russell Field and Clingman's Dome to rehydrate, and at one point I talked with some folks, asking them about if they knew anything about respiratory ailments because something was clearly not right with me and I was eager for help.

But there's no -- no road access anywhere between Clingman's Dome and Russell Field, so there was no way to hike out or to turn around at this point. My best hope was to get to Russell Field at mile 58. So I continued pressing on, hoping to get there before dusk at this point, because I had slowed my pace tremendously.

My breathing continued to get worse, to the point where I could only walk 100 yards and then would have to stop and sit down on the trail to try to catch my breath.

Q. What did it feel like to try to breathe in deeply?

A. It hurt. It was a -- it was like a pain in my throat and in my chest, and I could not get the breath in. And I didn't know anything about respiratory ailments. I didn't know what asthma was, and so I thought this was something like asthma because that's just the word you hear when you have breathing problems. So I asked one person who was at a shelter about asthma, and he said, well, maybe you should try breathing through a wet cloth; that might help lubricate your lungs. So I tried breathing through my wet shirt that I was wearing. And that may have helped a little bit, but my problems continued to get worse as I moved further along the trail, and it continued to get dark.

Q. What time had you planned to meet your wife at Russell Field?

A. I planned to meet her around 6:00 p.m. That was a very liberal estimate, considering my fitness level and my pace. But, as it turned out, this stretch really slowed me down. It was dark, and I still was several miles from the Russell field shelter and was doing everything I could to press on, because at this point I was mostly worried, actually, about my wife. She was hiking in five miles to this shelter, expecting to meet me, and I wasn't going to make it, and that worried me immensely because she was by herself, a female hiking in the Great Smoky Mountains by herself at night, in bear country, and expecting her husband to arrive. And with

me not arriving, I knew that would worry her greatly, so pressed on primarily just to try to get to her.

Q. How far did you get that night?

A. I got within three or four miles, but it was so dark and I was stumbling over rocks and roots and stepping on small animals, and then, at one point, I jumped a bear. There was a bear along the trail that bolted right out and ran. And when that happened I realized that this was -- this was getting dangerous.

And there was no moon out that night, so I couldn't see anything other than outlines of shadows of things. Like the bear, I could see the outline of it running away. I could see the outline of brush and trees. But I couldn't even read the map that I had with me. And so, fortunately, I had a watch that had a little glow light on it that enabled me to read the map and direct me to a nearby shelter about four miles from where I was supposed to meet Emily, the Spence Field shelter, which is somewhere in here. And that's where I ended up spending the night, because I had no choice; I literally couldn't make it any further. My breathing was so labored and so painful and it was so dark that I was left with no other choice.

Q. How long did you stay there at that shelter?

A. I stayed there -- I got there probably between 10:00 and 11:00 that night and stayed there until the first hint of

daylight showed up in the sky. Didn't really sleep, but I just sat myself down and laid down. There were a couple other gentlemen in the shelter that night. One of them loaned me a blanket. I was covered in sweat and bugs, and I just wrapped myself in this blanket to try to calm my breathing down. And it seemed to work. But I was really, really concerned about my wife and wanted to get to the next shelter so that I could reassure her and make sure she was okay. And so as soon as I saw the hints of light in the sky, I bolted from the shelter to try to get to Russell Field.

Q. What happened? By the time it was dawn, had your ability to breathe changed any?

A. It had, which was -- which was a blessing, because I was quite concerned about my ability just to make it to the next shelter to see my wife. But when I started running, I felt great. My breathing problems had dissipated. It was early in the morning. It was -- you know, it was a cool -- it was cool again. And so I was able to run without any problems to Russell Field.

Q. When you got to Russell Field, was your wife there?

A. She was not. She had left and hiked back down the trail and was driving around to meet me at the end of the run. I was informed by the people at that shelter what she had done.

Q. What was it like when you met your wife?

A. It was -- it was a pretty powerful moment for us. She

told me about what happened to her that night, with bears coming to the shelter and --

Q. She'll tell her story.

A. She was visibly upset by what had happened to her and to me, and it was a very joyous and emotional reunion at the end.

Q. Did you have occasion to, after this was over, to write a journal of this?

A. Yeah. I wanted to remember everything that had happened here, and because family and friends were interested in what had happened as well, I just, the next day, I put everything down on paper in journal form.

Q. And I'd like to show you what's been marked as Plaintiff's Exhibit 223 and ask you if you can identify what that is.

A. Yeah. This is my journal entry, basically. I just basically wrote down a, roughly, hour-by-hour account of my experiences on the run. This was written a day or two after the actual run, so it was just my initial observations and what I suspected had happened to me a day or two after the event.

Q. Now, subsequent to the -- did you seek to find out -- or did you seek any medical advice that week about --

A. Yes.

Q. -- what had happened to you?

A. Yes. My wife is a doctor, and she obviously was very concerned about what had happened, and I was incredibly concerned because this was my running career. I was very concerned that I couldn't breathe for the first time in my life, and running was such an integral part, not of my career necessarily, but of just who I was. I had run every day of my life since I was 5 years old, roughly, and I was worried that I wasn't going to be able to run again because of these breathing problems, so I sought medical advice right away. I went to first a family practice doctor where my wife was training, at MAHEC, and they were very concerned and they said it sounded like I had experienced something like asthma, asthma-like symptoms, and so initially that's what we thought it was; we thought it was something like asthma.

Q. Is that why you referred to it as asthma in your journal?

A. Yeah. I mean, that was the only label I had ever heard for breathing problems related to running, was asthma, exercise-induced asthma or something like that.

Q. Had you ever been diagnosed with asthma before that?

A. I never did get diagnosed with asthma.

Q. Did you subsequently have occasion to be examined again?

A. I did. So I sought every specialist I could find to try to figure out what had gone wrong here because I was very concerned, and so I went to an allergist to see if maybe I

had some kind of allergic reaction to something, but no, there were no allergies.

I went to a respiratory specialist as well, Dr. Sue Zeilender, to see if I, indeed, did have asthma, and it turned out I did not. I had asthma-like symptoms, but the testing revealed that it was not asthma that was specifically causing this.

Q. Did you at some point undertake -- let me ask you this. Subsequent to the -- are you familiar with the EPA website called "AIRNow"?

A. Yes. I check that -- even before this run, I checked it on a daily basis just to see what the pollution levels were where I was running. It's a sad but unfortunate necessity when you're running in the mountains that you have to check air pollution levels before you go out and run. And so I had seen this website even before this run, and I check the maps and look at it on a daily basis.

MR. GULICK: Bear with me a moment, Your Honor.

(Pause in the proceedings.)

BY MR. GULICK:

Q. Want to show you what's been marked -- if you could eliminate those marks on the ...

Want to show you what's been marked as Plaintiff's Exhibit 224.

MR. GULICK: Your Honor, this is a video of the

"AIRNow" website that we're going to show, with the Court's permission, and we'll ask -- and we do have a certified copy, I believe, from the Environmental Protection Agency, certifying this as a public record.

BY MR. GULICK:

Q. I want to ask you, is this the date that you were running?

A. This is the date I was running.

Q. And is this the "AIRNow" video that you viewed --

A. Yes.

Q. -- on that day?

A. Yes, it is that video.

MR. GULICK: Gary, would you go ahead and run it?

(Video playing.)

MR. GULICK: This is a continuous loop. Going to run it twice. It shows the hour of the day at the bottom of the page.

BY MR. GULICK:

Q. All right. Mr. Harlan, what was the -- what was the "AIRNow" showing? What was --

A. It was showing that it was hazardous for me to be running that day in the Great Smoky Mountains National Park.

Q. Was this an ozone --

A. Yeah, this was an ozone alert day. And right in the Great Smoky Mountains National Park, an orange alert right in

the areas where I was running, along the spine of the Appalachians, the Appalachian Trail. The high elevation was even more bathed in the pollution than anywhere else.

Q. Let me ask you this. Have you, subsequent to that day, had a similar occurrence, breathing occurrence like what occurred to you on that day?

A. Not to that severity, but I have had similar breathing problems, and they've always occurred on ozone alert days or high pollution days in the summer when I'm running in the afternoons. Those are the only times when I experience these severe breathing inhalation problems.

Q. Have you altered your running schedule as a result of this?

A. Yeah. Unfortunately, I've had to modify my running in many ways. I run only in the mornings now, and I religiously check the "AIRNow" website just to see the pollution levels for that particular day and the forecasts. And it's unfortunate that I've got to squeeze my running in in the early morning because, otherwise, I'm going to experience these severe breathing problems if I try to run later in the day, I've learned.

So it's forced me to limit the amount of my running. It's curtailed my running career. I was a competitive runner, winning lots of races, and I've had to scale back my training. And that's discouraging. But even more depressing

for me is just the fact that I can't run as much as I used to, and running is just part of the fabric of who I am. It's something I do on a daily basis just to clear my head and cleanse my body and soul, and the fact that running could be hazardous to my health is very upsetting to me, and the fact that I have to worry about pollution constantly when I'm running is very upsetting.

MR. GULICK: Your Honor, we would offer into evidence Will Harlan's training log, Exhibit 221; his hand-drawn map, 222; his journal entry, 223; and, Your Honor, Exhibit 224. And I have -- we're trying to -- we have a copy here we're locating, Your Honor, of our affidavit from an employee of the United States EPA that he had -- which authenticates the "AIRNow" video extract as, again, a document in the legal possession of the EPA. Unfortunately, at the moment, we only have a copy. We will locate the original.

THE COURT: All right. Let those be admitted.

(Plaintiffs' Exhibits 221, 222, 223 and 224 received.)

MR. GULICK: Your witness.

MR. FINE: We have no questions, Your Honor.

THE COURT: All right. Mr. Harlan, you may be excused. That will complete your testimony.

MR. GULICK: Your Honor, we'd briefly call Emily

Diznoff to the stand.

Please come around and be sworn.

EMILY DIZNOFF,

being duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. GULICK:

Q. Ms. Diznoff, are you married to Will -- please state your name for the record.

A. Emily Diznoff.

Q. And are you married to Will Harlan?

A. I am.

Q. And what is your profession?

A. I'm a family practice physician.

Q. And where do you work?

A. At Asheville Family Medicine.

Q. Where did you receive your medical training?

A. At Emory University School of Medicine in Atlanta, Georgia.

Q. And I'm just going to show you Plaintiff's Exhibit 438, which will appear on your screen, and ask if you can identify it.

A. That is a copy of my resume.

Q. Is that a true and accurate copy of your resume?

A. It is.

Q. I'm not going to ask you any opinions today, but I want

to ask you about your part of this experience.

First of all, I want to ask you about, are you familiar with your husband's running career?

A. Yes, very familiar.

Q. And you've accompanied him on running trips such as this before?

A. Many. I have been sort of crowned his number one crew. I've sort of organized most of his races, crewed all his races, and have been with him for 12 years, so as long as he's been running competitively.

Q. Now, on this particular occasion -- you, of course, heard his testimony. What was your experience after you went -- you were going to Russell Field. Simply describe that briefly.

A. After I was at Russell Field? I arrived at Russell Field -- actually, I was concerned -- I remember having concern that I was going to -- that he was going to get there before me, I had to drive all the way around and hike in five miles, and I do remember thinking I hope I get there in time, because that was the estimation of the time we thought it would take him to get there.

So I arrived there and found several other hikers. I think it was three other men who were there, two separate parties, one man by himself and two others who were there together who had decided to stop there for the evening. And

I arrived, told them what my husband was doing, and sat and waited.

Q. And what happened -- when were you expecting him to arrive?

A. Probably was thinking he'd get there -- I did not have a watch, so I was thinking he would get there about 6:00 or 6:30. Way before dusk.

Q. And did he, in fact, arrive?

A. He did not arrive. We waited --

Q. What did you do?

A. -- and waited.

I was very, very distraught. As it got later on -- at first I thought, you know, I thought maybe he was just running a little late. As it started to get dark out, I was, I would say panicked. I convinced one of the other people who was there to walk with me down the trail toward the direction I anticipated he would be coming, and, you know, we were calling his name, yelling his name, and I was, you know, just screaming. And they were like, you know, this is pretty useless; your voice isn't going to travel very far.

We came back to the shelter area, and that's when a bear came into the area. And then I started to get really scared because I knew it was getting later, it was getting darker, there was a bear, and we had to go into the shelter and shut the shelter door, and I was with three strange men. I had no

cell phone that would work, no sleeping bag, just a little backpack with me, no food, no water, and it was at that point getting very dark and I was getting really scared.

You know, I knew that -- I know my husband very well and I know that nothing would have stopped him from getting to me unless it was really serious. And as it got later and later and darker and darker and I was almost 100 percent convinced that something serious had happened to him, I remember laying down on a mat that one of the people had lent me, thinking, how am I going to call his mother and explain to her that he died. I mean, I remember having that thought in my head, I'm going to have to tell her that he died, and I basically cried myself to sleep and laid there scared.

Q. So you stayed the night there?

A. I did stay the night there.

Q. And what did you do?

A. Shivered in the cold and laid there. And as soon as daybreak came, I -- you know, I knew I had to race back down five miles of trail. And, you know, I didn't even know what I was going to do. I had to get to my car. My plan was to go back to Fontana Dam, where he was supposed to finish. I thought maybe I missed him, maybe something happened. And I knew that was where the people were supposed to be that we were going to meet at the finish line. So that's what I did.

Q. And did you, eventually, go around to Fontana Dam?

A. I did, thank goodness, You know, it turned out to be just a disaster all around. The road that I had intended to take, I couldn't pass. I got caught in Cades Cove Sunday morning traffic. And by the time I got to him, he had already finished and he was -- there was a little house or little cottage that some people we were with had rented where we thought we were going to spend the night when we finished the race, or the run, and they had stayed there. And at that point, Will was in the shower, and I remember just running into the bathroom just crying and, you know, just so happy to see him alive at that point.

Q. Have you had occasion to be with him on another occasion when he's actually suffered this particular event?

A. I'm not usually with him when it first starts because it's usually when he's on a run, but I've been there, you know, at rest points and after the runs, and, yes, I have been in close contact with him.

Q. And how would you describe it?

A. The way he always describes it and the way I see it is that it appears that he has pain when he tries to take a deep breath in, so he can't fully expand and get air in. You know, I've actually listened to his lungs, and he is not truly wheezing when it happens; it's just that he can't get a breath in.

Q. And did you accompany him to various doctors as he was

trying to get a diagnosis of what happened to him?

A. I did. Being that I'm a local physician, I was very eager to get him in to see anyone and everyone that could help us. Initially, I had him go be seen at my residency program, where he was given an Albuterol inhaler to use if it were to happen again, which he tried and it didn't work.

So, after that -- I can't remember the exact order he saw them in, but he did see an allergist, he saw a pulmonologist, and an ear, nose and throat doctor, and no one was ever really able to give us any clear answers.

I know the pulmonologist offered to send us to Colorado, where there was an exercise specialist he knew. People had ideas and gave us different suggestions, but no one could eliminate the problem with whatever treatment they proposed.

Q. From your perspective, has this experience changed Will's running condition and career?

A. Will is not a morning person at all, and he now gets up and runs in the morning. So, yes, it has. And he is not running competitively like he had been before. He had been very, very active, not just locally, but nationally, in competitive distance running, ultra-marathons, and if you look at his record -- you know, if you look at his recent runs, he's just not running as much.

MR. GULICK: Thank you. I have no further questions.

MR. LANCASTER: Defendant has no questions for Dr. Diznoff.

THE COURT: Thank you. That will conclude your testimony and you are excused.

MR. GULICK: Your Honor, our next witness is Dr. David Peden, and he's going to take -- it's up to you. We can start him right now. He is going to take considerably longer than the ten minutes. But not as long as Tuesday's witness.

MR. LANCASTER: I venture to guess no one will take that long.

THE COURT: All right. Given that assurance, we'll break a little early and come back at 2 o'clock.

MR. GULICK: Thank you, Your Honor.

(Lunch recess.)

* * * * *

[END OF VOLUME 4A]

UNITED STATES DISTRICT COURT

WESTERN DISTRICT OF NORTH CAROLINA

CERTIFICATE OF REPORTER

I certify that the foregoing transcript is a true and correct transcript from the record of proceedings in the above-entitled matter.

Dated this 18th day of July, 2008.

S/ Karen H. Miller

Karen H. Miller, RMR-CRR
Official Court Reporter